IMPORTANT! - READ ALL INSTRUCTIONS BEFORE OPERATING THIS EQUIPMENT

It is the customer’s responsibility to have all operators and service personnel read and understand this information. Contact your ITW Dynatec customer service representative for additional copies.

NOTICE! Please be sure to include the serial number of your application system each time you order replacement parts and/or supplies. This will enable us to send you the correct items that you need.

ITW Dynatec Service Parts Direct Dial: 1-800-538-9540
ITW Dynatec Technical Service Direct Dial: 1-800-654-6711
This Service Manual is available in the following versions:

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Chapter 1
SAFETY PRECAUTIONS

All operators and service personnel must read and understand this manual before operating or servicing equipment.

All maintenance and service on this equipment must be performed by trained technicians.

Electrical

DANGER
HIGH VOLTAGE

Dangerous voltages exist at several points in this equipment. To avoid personal injury, do not touch exposed connections and components while input power is on. Disconnect, lockout and tag external electrical power before removing protective panels.

A secure connection to a reliable earth ground is essential for safe operation.

A disconnect switch with lockout capability must be provided in the line ahead of the unit. Wiring used to supply electrical power should be installed by a qualified electrician.

High Temperatures

WARNING
HOT SURFACE

Severe burns can occur if unprotected skin comes in contact with molten adhesive or hot application system parts.

Safety glasses, gloves and long-sleeved clothing must be worn whenever working with or around adhesive application systems.

High Pressure

WARNING
HIGH PRESSURE PRESENT

To avoid personal injury, do not operate the equipment without all covers, panels and safety guards properly installed.

To prevent serious injury from molten adhesive under pressure when servicing the equipment, disengage the pumps and relieve the adhesive system’s hydraulic pressure (e.g., trigger the heads, hand-held applicators, and/or other application devices into a waste container) before opening any hydraulic fittings or connections.

Protective Covers

WARNING
DO NOT OPERATE WITHOUT GUARDS IN PLACE

Keep all guards in place!

To avoid personal injury, do not operate the application system without all covers, panels and safety guards properly installed.
Eye Protection & Protective Clothing

WARNING
EYE PROTECTION REQUIRED

PROTECTIVE CLOTHING REQUIRED

It is very important that you PROTECT YOUR EYES when working around hot melt adhesive equipment!

Safe Installation and Operation

To avoid possible failure of hoses, make sure all hoses are routed to avoid kinking, tight radius turns (8" or less) and abrasive contact. Hot-melt hoses should not have prolonged contact with heat-absorbing surfaces such as cold floors or metal troughs. These heat-absorbing surfaces can alter adhesive flow and cause incorrect calibration. Hoses should never be covered with materials that prevent heat dissipation, such as insulation or sheathing.

Read this manual before applying electrical power to the equipment. Equipment may be damaged by incorrect electrical connections.

Do not use adhesive that is dirty or that may be chemically contaminated. Doing so can cause system clogging and pump damage.

When adhesive hand-held applicators or other movable applicators are used, never point them at yourself or at any other person. Never leave a hand-held applicator’s trigger unlocked when not actually in use.

Do not operate the hopper or other system components without adhesive for more than 15 minutes if the temperature is 150 degrees C (300 degrees F) or more. To do so will cause charring of the residual adhesive.

Never activate the heads, hand-held applicators and/or other application devices until the adhesive’s temperature is within the operating range. Severe damage could result to internal parts and seals.

Treatment for Burns From Hot Melt Adhesives

Burns caused by hot melt adhesive must be treated at a burn center.

Care should be used when working with hot melt adhesives in the molten state. Because they rapidly solidify, they present a unique hazard.

Even when first solidified, they are still hot and can cause severe burns. When working near a hot melt application system, always wear safety gloves, safety glasses and long-sleeved, protective clothing.

Always have first-aid information and supplies available.

Call a physician and/or an emergency medical technician immediately.
Service

Refer all servicing to qualified personnel only.

Explosion/ Fire Hazard

Never operate this unit in an explosive environment.

Use cleaning compounds recommended by ITW Dynatec or your adhesive supplier only. Flash points of cleaning compounds vary according to their composition, so consult with your supplier to determine the maximum heating temperatures and safety precautions.

Lockout/ Tagout

Follow OSHA 1910.147 (Lockout/ Tagout Regulation) for equipment's lockout procedures and other important lockout/ tagout guidelines.

Even after the equipment has been locked out, there may be stored energy in the application system, particularly in the capacitors within the panel box. To ensure that all stored energy is relieved, wait at least one minute before servicing electrical capacitors.

In This Manual

WARNINGS and CAUTIONS are found throughout this manual.

WARNINGS mean that failure to observe the specific instructions may cause injury to personnel.

CAUTIONS mean that failure to observe the specific instructions may damage the equipment.
Chapter 2
DESCRIPTION AND SPECIFICATIONS

Description

The DYNA MELT® M Series adhesive supply units (ASU) are computer-controlled hot-melt supply units designed on metric standards. Their control panels, with choice of display languages, provide comparative data of all setpoints, motors, etc. on a few convenient, comprehensive display screens.

The Dynamelt M Series ASUs are available in three cabinet sizes and offer four hopper sizes. The Dynamelt M 35 uses a microprocessor temperature control to closely control the temperature of hot-melt adhesive for up to 4 hoses and 4 heads. Temperature setpoints are operator-selected for up to 16 zones and the system automatically provides warnings and alarms for operator errors and system malfunctions.

The Dynamelt/DynaControl system provides accurate, proportionate temperature control for the hopper, hoses and applicators. Sequential heating delays may be programmed for turn-on of the hoses and heads. A “standby” temperature may be programmed so that the temperature zones can be maintained at a lower temperature when the ASU is not in active use, enabling rapid return to normal operation. The seven-day scheduler allows programmable automatic startup and shutdown of the ASU throughout the workweek.

With these flexible temperature programming features, the Dynamelt system increases adhesive life by eliminating prolonged high adhesive temperatures. It reduces energy consumption and brings the system up to normal operating temperatures in the shortest possible time.

A four-layered, shielded CPU board protects the microprocessor from external interference. The temperature control can interlock the parent machine with preselected adhesive temperatures so that production automatically begins when adhesive temperatures are correct for the application. All system temperature values can easily and quickly be programmed. An optional remote control panel gives control and monitoring flexibility.

Digital readout of system conditions is provided. A security code can restrict access to system programming and parameters. The CPU monitors the electronic circuitry and provides alarms for error conditions.

The Dynamelt M ASU uses an extremely dependable gear pump(s) to assure a smoother and higher precision flow. The single or dual pumps are driven by individual drives.

The Dynamelt’s teflon-coated hopper accepts adhesive in all popular forms, including pellets, slugs and blocks. The ASU can accommodate air-actuated automatic applicators (heads), electric applicators, hand-held applicators and/or special applicators. Options available include pressure gauge, drop-in grid, pendant control, adhesive level control, digital pressure readout and electric clutch.
Specifications

Environmental:
Storage/ shipping temperature ........................................... -40° C to 70°C (-40° F to 158°F)
Ambient service temperature ............................................. -7° C to 50°C (20° F to 122°F)
Noise emission ............................................................... < 60 dbA at 1 meter (39 inches)

Physical:
Dimensions ................................................................. see dimensional layouts on following pages
Number of heads/ hoses .................................................. 1 to 4 heads/ hoses
Number of return hoses or auxiliary zones ................................ 1 to 4
Number of hopper temperature zones ................................. 2 or 3 (add 1 for optional drop-in grid)
Number of pumps/ motors ................................................. 1 or 2
Number of standard drop-in grids ...................................... 1
Number of (optional) drop-in grids .................................... 1
Gear pumps ........................................................................ 2.92 cc/rev standard
Enclosure ........................................................................... styled, durable metal, dust and splatter resistant
Hose connections ............................................................. universal 15-pin Amphenol connectors at asu, wrench-secured fluid fittings (#6 JIC)
Hopper (tank) capacity ....................................................... 35 kg/ 77 lb
Hopper construction ........................................................ machined welded aluminum, Teflon impregnated
Filtration ........................................................................... hopper bottom screen, large pleated pump outlet filter
Weight of base unit, empty ................................................... tbd
Adhesive form .................................................................... accepts most forms

Electrical:
Supply voltage ................................................................. 200-240 VAC/ 3p/ 50-60 Hz
380-400 VAC/ 3p (“Wye”, “Y” or 5-wire connection)/ 50-60 Hz
Minimum supply amperes ................................................ see circuit breaker size
Power consumption: hopper and drop-in-grid ............................... 7500 watts
Hopper heater type ............................................................ cast-in tubular
Temperature control ........................................................ microprocessor-based proportional integral derivative (PID)
Temperature sensors .......................................................... 100 Ohm Platinum RTD standard
120 Ohm Nickel RTD optional
Electrical connectors ......................................................... durable, latching connectors
Motor ............................................................. 1/4 hp, alternating current TEFC* motor, direct drive, horizontal orientation
Maximum current available for each hose or head .................... 10 ampere

* totally enclosed, fan cooled
Performance:
A dhesive temperature control range ......................... 40°C to 232°C (100°F to 450°F)
Standby adhesive temperature range ....................... up to 80°C (150°F) lower than setpoint
Hopper ready adhesive temperature deviation (factory set/field adjustable) ± 20°C (36°F) from setpoint
Over-temperature cutoff for hopper .......................... 232°C (450°F)
Adhesive viscosity .............................................. 500 to 50,000 centipoise
Warm-up time, full hopper .................................. approximately 0.5 hour
Typical adhesive melt rate (depends on adhesive used) .......... 18-65 kg/hr (40-143 lb/hr)
Adhesive pressure .............................................. up to 68 bar (1000 psi) maximum

DynaControl Temperature Control:
Controller power board ..................................... 48 zones, modular construction
Display type .................................................... graphic, liquid crystal
Temperature control zones (DM35) .......................... 16 maximum with solid state relays
Power output .................................................... hopper: 5000 watt
............................................................... hose: 1200 watt
............................................................... applicator head: 1200 watt
............................................................... auxiliary: 2000 watt
Solid state relay ................................................. 3-15 VDC
Line speed inputs .............................................. 1 to 2

Other:
Display languages .............................................. English, French, German, Spanish, Swedish, Italian, Japanese,
Portuguese and Dutch
Operator interface .............................................. multi-zone, liquid crystal display with
alpha/numeric keyboard and function keys
Temperature standby .......................................... yes
High and low temp alarms .................................... yes
Ready interlock ................................................. yes
Password protection .......................................... yes
Sequential heating ............................................. yes (hopper, hose, head staged heating)
Sensor open alarm ............................................. yes
RS232 and RS485 communications capable .................... yes
Line Speed Tracking ........................................... yes
Seven-day scheduler .......................................... yes
CE approval .................................................... yes
DYNAMELT M35 DCL Installation Dimensions

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<th>C</th>
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<th>E</th>
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<th>J</th>
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<td>mm</td>
<td>863.60</td>
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<td>336.55</td>
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<td>30.80</td>
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Total System Wattage Capacity

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<tr>
<td>Hopper + High Temp Heater</td>
<td>6000 w</td>
</tr>
<tr>
<td>Pre-Melt</td>
<td>2500w</td>
</tr>
<tr>
<td>Optional Drop-in Grid</td>
<td>2500w</td>
</tr>
<tr>
<td>Up to 4 Hose Zones (1200 w each)</td>
<td>4800 w</td>
</tr>
<tr>
<td>Up to 4 Applicator Zones (1200 w each)</td>
<td>4800 w</td>
</tr>
<tr>
<td>Up to 4 AUX Zones (2000 w each)</td>
<td>8000 w</td>
</tr>
<tr>
<td>Maximum System Wattage:</td>
<td>28,600 w</td>
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Main Circuit Breaker Determination

Main circuit breakers vary depending on each unit’s system configuration. ITW Dynatec typically determines the main circuit breaker by the mains load for a system, which, by codes, should be 125% to 150% of the maximum load. If a customer later modifies his system (by adding heads, hoses, auxiliary outputs, etc.), the main breaker may need to be upgraded to reflect the increase in load.

To determine your existing main circuit breaker, first determine if the ASU has been modified and the breaker upgraded accordingly. If not, and the breaker is original to the ASU, you will find the main circuit breaker listed in the Panel Box Assembly (PBA) section of the indented bill of materials inserted at the back of this manual. The main circuit breaker is the largest amperage circuit breaker listed in that bill of materials.
Definition of Code: DYNAMELT DM 35 ASU w. DynaControl Controller

**ASU Code:** M X X D X #X X X / #X X X X D # P X - XX, X, X...

- **M 35 D N G A S / I Z L S 2 D 2 P 2 - F 1 G C**

**Motor/ Drive Groups (1 pump)**

<table>
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<th># Rear</th>
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**Code PN Options**

- **C** 107793 Memory Card Reader Kit
- **M** 101563 Additional Memory Card
- **D** Digital Pressure Readout
- **E** 107945 Electric Clutch Kit
- **F** Filter Selection
- **F1** 101246 40 mesh outlet filter
- **F2** 101247 100 mesh outlet filter (Standard)
- **F3** 106273 150 mesh outlet filter
- **G** 805641 Analog Pressure Gauge Kit
- **K** N06642 Signal Isolator
- **L** 802886 One-Point Level Control Assy
- **P** 107643 Remote Display Kit
- **Q** 108475 RS232/485 Communication
- **R** 108313 Digital RPM Readout
- **Y** 108425 Handgun Trigger Kit
- **Z** 106103 Drain Valve

**Code PN Base Unit**

- **35 106049 35kg (77 lb) Hopper**

**Code PN Grids**

- **N n/a Standard**
- **G 804634 Add Drop-in Grids**
- **O n/a Omit Drop-in Grids**

**Code PN Pump(s)**

- **GAS 100860 Dynatec 1.54cc single**
- **GBS 100861 Dynatec 3.18cc single**
- **GCS 100862 Dynatec 4.5cc single**
- **GAD 100863 Dynatec 1.54cc dual**
- **GBD 100864 Dynatec 3.18cc dual**
- **ZLS 084E372 Zenith 0.160cc single**
- **ZDS 084E428 Zenith 0.297cc single**
- **ZES 084E374 Zenith 0.584cc single**
- **ZFS 084E430 Zenith 1.168 single**
- **ZGS 084E434 Zenith 2.92cc single**
- **SHS 108875 S&P 8.5cc single**
- **ZLD 084E387 Zenith 0.160cc dual**
- **ZDD 084E388 Zenith 0.297cc dual**
- **ZED 084E 389 Zenith 0.584cc dual**
- **ZFD 084E432 Zenith 1.168 dual**
- **SGD 108874 S&P 2.92cc dual**
- **SPC Special Pump (see sales order)**

**Code PN Panel Box Assembly**

- **PA 806456 1 drive, 2 hose/ 2 head/ 2 auxiliary, 240v**
- **PB 806457 1 drive, 2 hose/ 2 head/ 2 auxiliary, 380v**
- **PC 806458 2 drive, 4 hose/ 4 head/ 4 auxiliary, 240v**
- **PD 806459 2 drive, 4 hose/ 4 head/ 4 auxiliary, 380v**

**Code PN Options**

- **C** 107793 Memory Card Reader Kit
- **M** 101563 Additional Memory Card
- **D** Digital Pressure Readout
- **E** 107945 Electric Clutch Kit
- **F** Filter Selection
- **F1** 101246 40 mesh outlet filter
- **F2** 101247 100 mesh outlet filter (Standard)
- **F3** 106273 150 mesh outlet filter
- **G** 805641 Analog Pressure Gauge Kit
- **K** N06642 Signal Isolator
- **L** 802886 One-Point Level Control Assy
- **P** 107643 Remote Display Kit
- **Q** 108475 RS232/485 Communication
- **R** 108313 Digital RPM Readout
- **Y** 108425 Handgun Trigger Kit
- **Z** 106103 Drain Valve
Chapter 3
INSTALLATION

Placing the DYNAMELT M ASU

The DYNAMELT® M SERIES ASU can stand alone on flat surfaces. The main electrical power and the serial communication connections come in from below the unit and connect under the DynaControl keypad, so access is needed there.

For installation dimensions, see illustration on page 2-4.
Re-read Chapter 1 “Safety Precautions” before performing any installation procedures. All installation procedures must be performed by qualified, trained technicians.

To Open/Close Panel Box Door

1. With the key supplied, unlock the panel box door.

2. Turn the main disconnect switch counterclockwise to “Reset” while pushing the tab clockwise with your thumb.

3. Pull door open.

4. To close: Turn switch to “ON”. Hold door closed while turning switch to “Reset” and then back to “ON”.

5. Lock the panel box door with the key.

Installation

After the DYNAMELT M SERIES ASU has been properly positioned, the following general sequence should be followed for installation:

1. Make sure that incoming line power to the ASU and that the unit’s main disconnect switch are turned OFF.

2. Within the panel box assembly: Connect 3 electrical leads with the appropriate voltage to the main circuit breaker and connect one electrical lead to the ground (PE) terminal (see diagram following).

380v ASUs only: In addition to above, connect one lead to the neutral terminal.

DANGER HIGH VOLTAGE

Disconnect and lock out input power to the application system, using the lockout safety illustrated above, before starting any installation procedures. Make sure there is no electrical power on the leads you will be connecting.

CAUTION: Grounding conductors never carry electrical current. The use of a neutral conducting wire as earth ground is incorrect and may cause damage to the controller.
3. At installation, the customer must make the following terminal connections into the ASU’s printed circuit boards (PCBs). The boards do not need to be removed from the ASU in order to make connections.

See the detailed layout on the next page for locations, and refer to the detailed layout drawings of the PCBs in Ch. 7, if needed.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE</td>
<td>Input Power from Main Power 240vac Ground</td>
</tr>
<tr>
<td>N, PE</td>
<td>Input Power, from Main Power, 380 vac Neutral, Ground</td>
</tr>
</tbody>
</table>

**Required connections for standard 240 vac ASU:**
- Main Power Switch/L1, L2, L3 Terminal rail

**Required connections for 380 vac ASU:**
- Main Power Switch/L1, L2, L3 Terminal rail

**Non-essential connections; connect if feature is desired:**
- R1, R2 Normally Open Ready (parent machine interlock)
- A1, A2 Normally Closed Alarm (controller display alarms)
- E1, E2 External Standby (controller standby mode)
- P1, P2 Program Select 1&2 (controller program selection)
- P3, P4 Program Select 3&4 Power On Output

**Options: Make connections for the following if installed on your ASU:**
- S1, S2 Tachometer (line speed tracking)
- H1, H2 Hand-Held Applicator, Footswitch
- Low Adhesive Level (output alarm)
- Pressure Transducer(s) (1 to 4 transducers)
- Pressure Transducer(s) (high & low psi alarms)
- Clutch Customer Enable (for motor 1)
- Clutch Customer Enable (for motor 2)
- Ribboncable RS232/485 Communication

**Program Selection Table**

<table>
<thead>
<tr>
<th>Program #</th>
<th>P1/P2 Pin 1</th>
<th>P3/P4 Pin 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>open</td>
<td>open</td>
</tr>
<tr>
<td>2</td>
<td>closed</td>
<td>open</td>
</tr>
<tr>
<td>3</td>
<td>open</td>
<td>closed</td>
</tr>
<tr>
<td>4</td>
<td>closed</td>
<td>closed</td>
</tr>
</tbody>
</table>

* MCI = Motor Control Interface PC Board

**User Connections**

<table>
<thead>
<tr>
<th><strong>Program Selection Table</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>P1/P2 Pin 1</td>
</tr>
<tr>
<td>open</td>
</tr>
<tr>
<td>closed</td>
</tr>
<tr>
<td>open</td>
</tr>
<tr>
<td>closed</td>
</tr>
</tbody>
</table>
Printed Circuit Board Location Diagram

The printed circuit boards (PCBs) are located within the main panel box assembly.

Note: When multiple PCBs are installed to accommodate multiple components (i.e., two motor speed control PCBs and two motor control interface PCBs to accommodate two motors, as illustrated below), make connections to all PCBs.
4. The adhesive hoses are connected at the rear cover (see illustration on page 3-6). Each hose is connected at both an adhesive port and an electrical connect. Make your electrical hose connections at the numbered connects above the filter manifolds. Route hoses so that there is at least an eight-inch radius at any bend. Do not hang hoses without proper support. Do not crimp, clamp, squeeze or tie hoses.

Two feed hose adhesive ports are located at the bottom of each filter manifold. When making hose connections, use the numbered guides shown on the illustration to coordinate; ie. when using one hose make your hookup to electrical connection #1 and adhesive port #1. When using two heads/ hoses, hookup hose/ head #1 to electrical connection #1 and adhesive port #1, then hookup hose/ head #2 to electrical connection #2 and adhesive port #2, etc.

Two return hose adhesive ports are located at the top of each filter manifold. Use the illustration to coordinate adhesive port and electrical connections as above. Return hoses are designated as “auxiliary” ports.

5. Connect (optional) PSI transducers at the PSI ports labeled on the filter manifold. Position them from left to right across the manifolds as shown in the lower illustration on page 3-6. Transducers measuring adhesive pressure before it enters the filter use the ports stamped “Pre PSI” and transducers measuring pressure after the filter use the ports stamped “Post PSI”. Transducers must be wired into the pressure printed circuit board.

Units not using transducers may use either a PSI port or a feed hose port to mount a (optional) pressure gauge. If all ports are in use, the pressure gauge may be installed in line with a hose.

Refer to the hose and applicator manuals for further details on these items.
Dynamelt M35: Electrical Connection and Filter Manifold Arrangement for Maximum Head/ Hose Configuration

Note:
Always connect Auxiliary (Return) Hose #1 (A1) to Auxiliary Electrical Connect #1 (A1), Feed Hose #1 (F1) to Feed Electrical Connect #1 (F1), etc. as described on page 3-3.

Up to Two Filter Blocks with up to 8 Adhesive Ports
Adding Adhesive

The adhesive level in the melt tank should be maintained at 13mm to 100mm (1/2” to 4”) from the top of the hopper. Where applications demand a high output volume of adhesive, add small amounts of adhesive frequently. Adding large amounts of adhesive to an almost empty hopper will lower the temperature of the adhesive in the hopper and may cause the ASU to fall below its READY setpoint.

Changing the Adhesive Formula
If a different adhesive formulation from the one being currently used is needed, the system will have to be flushed if the two formulations are incompatible. See Chapter 6 of this manual for the proper flushing procedure. When in doubt about adhesive compatibility, flush your system.

Field Installation of Controller Options

Customers who choose to modify their adhesive supply unit with ITW Dynatec manufactured options should assure that only qualified technicians perform such installations. The installation of options that require specific procedures and/or calibration are outlined in this chapter.

Before controller options are installed, always turn the controller’s main power switch OFF. In most cases, turning the controller OFF will assure that the controller will retain its programmed parameters and configuration. Re-booting is not necessary.
## Adjusting the Pressure Relief Valve

The function of the pressure relief valve is to protect the gear pump(s) and the pump drive components from overload and to protect other components from potentially damaging pressure levels. The system will allow pressures up to 1000 PSI, however, typical factory settings are 500 PSI.

### WARNING HIGH PRESSURE

| NOTE: The following procedure will require the hot melt adhesive to be at a high temperature and the application system to have substantial pressure. Safety glasses, insulated gloves and long-sleeved protective clothing must be worn to prevent the possibility of serious injury from the molten adhesive. Refer to Chapter 1 and the section entitled “SAFETY PRECAUTIONS” for further details and First Aid information. |

### To Adjust Pressure Relief:

1. Turn the application system ON and raise the temperatures of all components to normal operating temperatures.

   Note: Position a bucket or other waste receptacle under the applicator(s) so that adhesive will be collected during the adjustment procedure.

2. At the controller, set the motor speed to “0” so that the gearmotor is not turning.

3. Locate the pressure relief assembly on the filter manifold (where the hoses attach to the ASU) and remove the access cover.

4. Position a heat-resistant container below the manifold. With a hex key screwdriver (allen wrench), slowly loosen the manifold’s two purge set screws (do not attempt to remove them). Allow adhesive and pressure to escape out of the manifold. Adhesive will drain into the container.

5. Remove the adjustment screw cap (see diagrams below) and loosen the jam nut. Turn the adjustment screw counter-clockwise until it is two turns from being completely out of the filter plug.

   Note: if the adjustment screw comes out of the filter plug, be prepared for some adhesive to flow out of the screw hole.

---

**Images:**

- **Screw cap**
- **Jam nut**
- **Adjustment screw**

**Diagrams:**

- Turning the adjustment screw counter-clockwise opens the outlet and decreases the pressure to the hose.
- Turning the adjustment screw clockwise closes the outlet and increases the pressure to the hose.
6. At the controller, turn the motor ON to its maximum operating speed.

7. Actuate (open) the valves on the applicator(s) in order to fill them with adhesive and purge air from the system.

8. Close the valves (those opened in the last step) to stop the flow of adhesive.

9. Using a wrench, turn the adjustment screw clockwise to increase the pressure to the applicator(s).

   **CAUTION:** Approach desired pressure with caution. DO NOT TURN THE ADJUSTMENT SCREW COMPLETELY CLOCKWISE (BOTTOMING IT INTO THE PLUG), since this would shut off the pressure relief channel and could cause extensive damage to the pump, motor and seals. Be aware that the higher the adjusted pressure, the more sensitive the adjustment is (i.e., at higher pressures, smaller adjustments to the screw will make larger changes to actual pressure).

10. After desired pressure is achieved, tighten the jam nut down onto the adjustment screw and lock it in place.

11. Replace and tighten the adjustment screw cap.

12. While the motor is operating at maximum speed, observe the adhesive flow from the applicator(s).

13. Reduce the motor speed, in increments of about 10%, until the adhesive flow begins to decrease.

   Note: Though the speed of the motor is reduced, there will be no change in the amount of adhesive flow coming out of the applicator. This is because the pressure relief is designed to allow only a maximum adhesive pressure regardless of the motor speed past a certain point.

   Then, increase motor speed in smaller increments (1 to 5%) until adhesive flow returns to the desired amount.

   Note: This is the optimum point of operation for the motor, pump and pressure relief. It will also facilitate the best system performance and reduce wear on these components.

   The application system is now adjusted for normal operation.

14. Re-tighten the two purge screws and re-install the access cover.
Pump Enable (Ready) Thermostat Calibration

The Pump Enable (Ready) Thermostat is preset to 132°C (270°F), unless the customer has specified a different preset temperature on his original ASU order. Generally, the pump enable thermostat is set approximately 30°C (50°F) lower than the application setpoint. If a different temperature is desired, use the following procedure to re-calibrate the thermostat.

**CAUTION: DO NOT set the pump enable thermostat lower than the softening point of your adhesive or pump damage may result.**

As an example: the operator desires to lower the preset Pump Ready temperature to 107°C (225°F).

1. At the controller keypad, set the hopper temperature setpoint to the temperature at which you want the pump to start, i.e. 107°C (225°F).

2. Use the key to unlock the side door, then remove it, being careful not to pull out the ground wire attached.

3. Wait for the hopper temperature to stabilize at 107°C (225°F), then:
   a. For thermostats with purple & black wire leads or tan leads: turn the thermostat’s adjustment screw counter-clockwise to increase the temperature (or clockwise to decrease it) until the pump’s motor begins turning. Adjust no further.
   b. For thermostats with tan (with tracer) wire leads: turn the thermostat’s adjustment screw clockwise to increase the temperature (or counter-clockwise to decrease it) until the pump’s motor begins turning. Adjust no further.

4. Replace the side door.

5. At the keypad, re-set the hopper temperature setpoint to its correct “run” temperature.
Calibration of the Optional Voltage Tachometer

A voltage tachometer allows the system operator to monitor gear pump motor speed from the controller. This information is useful since the amount of glue dispensed per product can be varied by adjusting the motor rpm (an increase in rpm = an increase in glue dispensed).

Calibration Procedure
1. Turn the application system ON and raise the temperatures of all components to normal operating temperatures.

2. Turn main power OFF and open the panel box door. Restore power to the ASU.

3. At the controller keypad, verify normal operation in AUTO, STOP and MANUAL modes (refer to "Motor Control Programming" in Chapter 5 if needed).

4. At the controller keypad, set motor speed to MANUAL mode and to 100% full speed.

5. With an external tachometer, measure the motor RPM.

6. On the Motor Control Interface PCB, turn the MAX ADJUST potentiometer until the RPM of the external tachometer reads 1800 rpm.

7. Calibration of this motor is complete. If additional motors are used on your application system, repeat the above procedure for each motor.

8. Close the panel box door and restore application system to normal operation.
Installation of the Optional Tach Generator or a DC Tracking Signal

The installation of a tach generator or a similar DC tracking signal allows speed tracking of the gear pump through voltage following. Multiple motor boards may be wired in parallel to the tach generator. On the controller, voltage following is referred to as the “AUTO” Mode of the motor control.

Installation Procedure

1. Disconnect and lockout input power to the application system.

2. Open the panel box and locate the Motor Control Interface Board (see layout illustration in Chapter 7). The device will be connected to the “0” and “10” terminals on X3.

3. A. To install a tach generator:
   i. If, when facing the shaft on the tach generator, the rotation of the shaft is clockwise, connect the black lead wire to the “0” terminal and connect the white lead wire to “10”.
   or
   ii. If, when facing the shaft on the tach generator, the rotation of the shaft is counter-clockwise, connect the black lead wire to the “10” and connect the white lead wire to “0”.

   iii. Verify that the gear pump motor is running at full speed when set to 100% in MANUAL mode. The output of the tach generator can be adjusted, depending on the application, but it must be at least 10 VDC to obtain full adhesive gear pump speed.

   Note: under no conditions will the motor ever run faster than this speed (100% Manual).

   B. To install a similar DC tracking device (not a tach generator):
   Connect the DC tracking voltage signals to the terminals so that the negative lead is connected to “0” and the positive lead is connected to “10”.

   Note: the tracking voltage must be at least 0-10 VDC, but not more than 0-25 VDC.

4. Close the ASU’s panel box door.

5. Re-connect input power and restore the application system to normal operation.

Proceed to “Calibration of the Optional Tach Generator or DC Tracking Signal”.

DANGER HIGH VOLTAGE

Dynamelt systems use electrical power that can be life threatening. Disconnect and lock out input power to the application system before starting any installation procedures.
Calibration of the Optional Tach Generator or DC Tracking Signal

After installation of a tach generator (or a similar DC tracking signal), the device must be calibrated at the DynaControl controller.

Prior to calibration, turn the application system ON and allow all components to warm up to normal operating temperatures (above ready temperatures).

1. Perform the following sequence at the controller keypad for each motor:
   a. Go to Motors screen.
   b. Choose AUTO mode. Press Enter.
   c. Scroll to Min % and enter a value of “0”. Press Enter.
   d. Scroll to Max % and enter a value of “100”. Press Enter.

2. Energize the parent line (tracking signal) to its full speed (at least 10 V DC at the “0” and “10” terminals at X3 on the Motor Control Interface printed circuit board).

3. On the Motor Control Interface printed circuit board (see illustration in Chapter 7) locate and adjust the web speed scaling potentiometer (VR1) clockwise until the “SET %” is below 99.8. Then adjust counter-clockwise until it equals 99.8%.

4. The system is now calibrated so that full parent machine speed corresponds to full speed of the gear pump.

The amount of adhesive dispensed can now be adjusted by trimming the pump RPM at the AUTO menu of the controller by adjusting the “MAX %” value down from the factory default of 100%. Adjusting the “MIN %” value corresponds to the pump speed when the parent line is stopped (0.0 volts at the “0” and “10” terminals). In most applications, the factory default (MIN % = 0) is used.
Level Control, Capacitive, Sensor with Amp

The level control device informs the ASU’s operator, via a “Level Low” message on the Dyna-Control controller’s System Status display, that the ASU’s hopper adhesive level is low. When the alarm activates, press “C” to reset it. You then have five minutes to refill the hopper before the alarm reactivates and the ASU’s pumps stop.

The capacitive sensor is mounted in the hopper. The sensor cable is plugged into the amplifier. DO NOT CUT the sensor cable.

Adjustment of the PN N08122 Level Control

To adjust the adhesive level control’s sensitivity, access the control’s amplifier, located inside the panel box assembly. On the amplifier (diagrammed below) is a sensitivity adjustment screw.

Turn the screw clockwise to increase sensitivity (or counter-clockwise to decrease). The yellow LED lights to indicate the presence of adhesive. When the LED goes out, the alarm will activate.
Field Installation of the Optional Memory Card Reader

If ordered as an option with a new Dynamelt ASU, the Memory Card Reader will be factory installed. To add a Memory Card Reader to a unit in the field, follow these installation instructions:

IMPORTANT: A Dynatec factory-formatted Memory Card (PN 107994) is required for the controller to function properly. Do not attempt to use any other card.

1. Switch OFF the Main Disconnect (this is the circuit breaker lever located on the panel box) and open the panel box door.
2. Remove the DynaControl mounting bracket from the ASU via four screws accessed from inside the panel box assembly.
3. On the inside of the mounting bracket, remove the two nuts from the cover over the card reader slot. Place the Memory Card Reader assembly into the cut out window with its ribbon cable connector facing inside. Use the two screws supplied to mount the assembly to the bracket.
4. Install either end of the 40-pin ribbon cable (supplied) into the connection on the Display CPU board.
5. Connect the ribbon cable from the CPU board to the connection on the Memory Card Reader assembly.
6. Re-install the mounting bracket onto the panel box with the four screws.
7. Close the panel box and re-connect input power to the application system and start up the ASU.
8. Insert the Memory Card into its slot on the control panel, with the terminal connection end of the card leading into the housing. The card will click into place when it is correctly inserted.

DANGER HIGH VOLTAGE

Dynamelt systems use electrical power that can be life threatening. Disconnect and lock out input power to the application system before starting any installation procedures. In addition, disconnect ALL incoming power to the ASU. POWER TO THE MAIN CIRCUIT BREAKER MUST BE DISCONNECTED.
8. On the controller’s keypad display, you will be asked to choose either: “SAVE” (meaning that data will be transferred from the controller to the card), or “LOAD” (meaning that data will be transferred from the card to the controller).

9. Press the F1 or F2 button to confirm your choice, or Press the F4 button to cancel out.

10. Re-insert the card and watch the controller’s display to see if the card is being read by the controller.
Typical Start-Up and Shut Down of the DYNAMELT M Application System

The following simplified sequence assumes that the DynaControl Controller has been programmed.

Start Up Procedures
1. Fill the ASU’s hopper with clean hot-melt adhesive to within a couple of centimeters (inches) of the top of the hopper. Close the hopper lid immediately to prevent contaminants from falling in. (Cover your bulk supply of adhesive to prevent contaminants also.)

2. Switch ON the Main Disconnect (the circuit breaker located on the panel box).

3. At the DynaControl keypad, press the controller’s F1 button, if prompted to do so.

4. Allow adequate time (approximately 20-30 min.) for the adhesive to melt and the temperatures of the temperature zones to stabilize. Monitor the System Status display to see when “Heat Up” changes to “Ready”. Undertemp arrows will blink until the temperature zones are up to ready temperature.

5. When temperatures are ready, the pump and motor are enabled to pump adhesive.

At the pump screen:
- Select Auto or Manual Mode. Select desired pump, press Enter.
  a. If Pump is in Auto Mode: Adhesive will begin to pump when the production line begins to operate.
  b. If Pump is in Manual Mode:
     i. Press Manual (F1). Press Enter.
     ii. Enter desired speed value. Press Enter.
     iii. Scroll to select next pump (if applicable). Repeat steps i thru iii until all pumps are programmed.

Adhesive will begin to pump once the pump enable thermostat closes and “Ready” condition is attained.

Shut Down Procedures
At the pump screen:
1. If Pump is in Auto Mode:
   a. Press STOP or STOP ALL (F3).
   b. Turn OFF the Main Disconnect Switch.

2. If Pump is in Manual Mode:
   a. Press STOP or STOP ALL (F3).
   b. Turn OFF the Main Disconnect Switch.

3. If 7-Day Scheduler is in use: Turn ON and OFF with the Controller On/Off pushbutton.

Note: Except in the case of the 7-Day Scheduler, use of the Main Power Switch to turn the unit OFF will avoid unexpected ASU activation in the event of a power outage.
Storage and Disposal of the DYNAMELT M Application System

Temporary Storage of the Unit

1. Flush the adhesive application system with flushing fluid (PN L15653), following the instructions detailed in chapter 6 of this manual.

2. Clean or replace both the outlet filter and the primary filter, following instructions detailed in chapter 6.

3. Shut OFF all pressure and power sources.

4. Release residual air pressure (if applicable).

5. Remove all residual adhesive and wipe components clean.

6. Remove all air lines (if applicable) and all power supply cables.

7. Pack the unit in a corrosion-proof manner.

8. Store the unit in such a way that it is protected from damage.

Disposal of the Unit

1. Shut OFF all pressure and power sources.

2. Release residual air pressure (if applicable).

3. Remove all residual adhesive.

4. Remove all air and adhesive hoses and all power supply cables.

5. Dismantle all components and sort into mechanical and electrical components.

6. Arrange for all components to be recycled.
Chapter 4
DynaControl™ CONTROLLER SET-UP

Temperature Control Functions in General

The DynaControl microprocessor-based proportional temperature control in the ASU performs a number of functions that help to maintain adhesive setpoints in all temperature zones of the DYNAMELT® system. It maintains permanent system values (fixed proportional and integration values that have been programmed at the factory, such as the maximum temperature setpoint). It enables the user to program temperature settings and heater on/off sequencing that are appropriate to a specific application. It displays all programmed values, and it includes self-diagnostic malfunction alerts and failure alarms. Note: Some DynaControl functions are direct temperature conversions between degrees Celsius and Fahrenheit. Other parameters are independently selected values.

Defining DynaControl Temperature Control Terms

Adhesive Temperature Control Range
The temperature limits within which the ASU, hoses and applicators may be programmed and maintained.

CPU Module
The central processing unit (CPU) of the microprocessor temperature control.

Cold Start
When the ASU resets itself to default setting due to either a malfunction or to a deliberately initiated cold start procedure. When the ASU is turned ON via the Main Power Disconnect Switch.

Default Settings
The factory-set programmable system values that will be in effect if the user does not enter new values. The controller will revert to its defaults whenever it is reset. The DynaControl controller’s defaults are listed in this chapter.

Error Indication Alarms
Alarms which indicate that the programmed over-temperature values have been exceeded for one or more hopper, hose or head zones. Alarms may also indicate an open or short-circuited sensor.

Mechanical High-Temperature Protection
A mechanical, redundant thermostat located on the hopper which turns OFF the system at 232°C (450°F).

Microprocessor-based Proportional Temperature Control
The built-in control system that controls, monitors and displays all system temperature values.

cont.
**Over-Temperature Setpoint**
The programmable temperatures that will cause alarms (blinking up and down display arrows) to occur when those temperatures are exceeded. Power is not disconnected, the READY contact opens and the alarm contact opens. If an external alarm has been connected, it will activate. The over-temp setpoint is the upper limit of the ready temperature range of each zone.

**PC Link**
Also referred to as remote I/O interface, this is a DynaControl controller option that allows monitoring and programming from a customer-provided PLC (programmable logic controller) or a PC (personal computer).

**P-I Loop**
A temperature control loop which bases heater output proportional (P) to the difference between setpoint and actual temperature and combines it mathematically with a time (I = integral) factor.

**Power I/O PCBs**
The Power I/O printed circuit board (PCB) provides control signals to, and monitoring signals from, all the temperature zones in the ASU’s system. The ASU’s hopper, hoses and applicators are controlled by the Power I/O PCB.

**Pump Enable Temperature**
The pump enable temperature protects the pump, pump shaft, motor and motor control board from damage by not allowing the pump to activate until a low limit (the programmed pump enable temperature) is achieved.

**RTD Sensors**
The standard Dynamelt system uses 100-ohm platinum resistance temperature detector sensors for all temperature controls. As an option, the unit can be configured for 120-ohm nickel sensors.

**Ready Temperature**
The programmable temperature, on gear pump models, which allows the ASU pump to turn ON. The default ready temperature range is a deviation of \( \pm 20^\circ C \) \( \pm 36^\circ F \) from the setpoint. The setpoint minus the deviation is the low limit of the range, and the setpoint plus the deviation is the high limit of the range.

**Recipe**
A program recipe is a set of temperature setpoints and parameters which the user has programmed and wishes to store in the controller for future use. Up to four recipes may be stored in the DynaControl controller.

**Sequential Heating**
The heating sequence which allows the slower-heating hopper to reach operating temperature without unnecessary use of electricity for faster-heating hoses and applicators. Sequential heating is the time period during which the hoses and applicators remain OFF while the hopper (and optional drop-in grids) heats up. Hoses and applicators may be independently programmed. If hopper temperature is above ready temperature when the ASU is turned ON, the hose and applicator...
sequence is bypassed and they will be turned ON. The heat up sequence is restored after Standby is turned from ON to OFF. Sequential heating is not needed for most applications and can delay total system warm-up time.

**Standby Condition**
The system condition where the ASU, hose and head temperatures are maintained at predetermined reduced temperature values. Standby temperatures are set lower than setpoint temperatures in order to reduce adhesive degradation and energy consumption when the system is temporarily inactive, and to permit rapid system warm-up when run condition is selected.

**Setpoint**
A programmable temperature that has been selected for hopper, hoses, applicators or auxiliary zones.

**Setpoint Limitation**
This is a universal maximum temperature for all zones. The programmer cannot program a temperature setpoint higher than the setpoint limitation.

**System Logbook**
This is the controller’s record-keeping function. It contains the DynaControl’s list of the last 1,000 controller events, its Data Logger which records the last 1000 lines of selected actual temperatures and a counter which records the system’s elapsed hours.

**Temperature Zone Enable**
The temperature zone enable allows the operator to disable unused temperature zones in such a way that they do not ever appear on the controller’s display and heating is switched OFF.

**Temperature Zone Offset**
Due to the separation between the heaters and sensors in some systems, the controller can be programmed to display a temperature for a zone which is different from the sensor’s actual temperature. The temperature zone offset mathematically corrects for these temperature differences. Each zone may have an individual offset.
Error Indication & Alarms

Error Indication (Blinking Up and Down Arrows)
The following illustration shows the display screen when one or more error indication conditions occur. The conditions that will trigger an error indication are:

a. When a hopper, hose, head or auxiliary zone has exceeded its selected over-temperature setpoint, which is the setpoint plus its high/low alarm setting, or when it is below its selected under-temperature setpoint, which is the setpoint minus its high/low alarm setting. In these cases, heater power will not be switched off.

b. When a hopper, hose, head or auxiliary zone sensor has an open circuit. In this case, heater power will be switched off.

Blinking up arrow indicates overtemp.  Blinking down arrow indicates undertemp.

“?” indicates no sensor (open circuit).
Error Alarms (Message Window)
The display of a message window, as illustrated below, signifies an error alarm. The operator’s response to an error alarm is to press “F4” and to troubleshoot.

If a sensor error alarm or an overtemperature alarm occurs during operation, the controller will switch off internal power to the heaters and an appropriate error alarm display will appear.

Pressing the “F4” function key acknowledges the error. If several zones display alarms, each must be acknowledged by pressing “F4”. The alarm display is switched off and the controller then switches off the faulty zone until the ASU is ready for operation again.

When the actual temperature exceeds the setpoint limitation (plus a tolerance) the overtemperature alarm window is displayed and main power is switched off.

Examples of Error Alarms

The Overtemperature Alarm indicates that the named zone has exceeded its programmed setpoint limitation. The controller will shut off power to the heaters. Press F4 and troubleshoot the problem.

The Sensor Failure Alarm can indicate either a sensor open or a sensor short. Sensor open is accompanied by a blinking up arrow on the actual temperatures display screen. Sensor short is accompanied by a blinking down arrow. Press F4 to reset the error message and then either a. manually turn the zone OFF (via Setpoints F1/ indicated zone/ On/Off F3), or b. troubleshoot the problem.

The Hopper Overtemp Alarm indicates that adhesive temperatures in the ASU’s hopper have exceeded the setting of the mechanical (redundant) thermostat. Press F4 and troubleshoot the problem.

The Communication Error Alarm indicates an internal failure, unrelated to zone temperatures. Call ITW Dynatec for assistance.
Optional System Status Lights

This tri-color stack light eases remote monitoring of the system’s status. The lower, white light illuminates when the system is turned ON. The middle, green light indicates that the system has warmed up to temperature setpoints (“ready”). The upper, red light illuminates only in an alarm condition and is accompanied by an audible alarm. The audible alarm is housed within the upper (black) section of the stack.

The status lights may be wired to indicate either high/low temperature, low adhesive level or open/short sensor. See Chapter 11 for wiring diagram.

Settings for a Typical Operation

Note: The values given here are approximate settings for a typical packaging operation. The values you choose will be based on the type of equipment and adhesive you are using and the nature of your particular operation.

If Application Temperature is 177°C (350°F):

- Hose and head temperature: 177°C (350°F).

- Hopper setpoint temperature: 163°C (325°F).

- Hi/Lo limit deviation: 12°C (20°F).

- ASU operating range: 149°C to 177°C (300°F to 350°F).

- Standby condition temperature (deviation): 30°C (50°F).

- Hopper over-temperature setpoint: 177°C (350°F)

- Mechanical thermostat (for the hopper) over-temperature: 219°C (425°F)

For most operations, temperature fluctuations will be very small and of short duration. For these reasons, the settings above are recommended.
System Values That Are Factory Programmed (not customer programmable)

- Minimum setpoint value: 10°C (50°F).

- Maximum setpoint value (Setpoint limitation): 218°C (425°F).
  " " " " for high temp mode enabled ASUs: 232°C (450°F)

- Maximum alarm deviation: 50° (C or F).

- Minimum alarm deviation: 5° (C or F).

- Maximum standby temperature: 150° (C or F) less than setpoint.

- Minimum standby temperature: 30° (C or F) less than setpoint.

- “Actual” temperature indication range: 0°C to 260°C (32°F to 500°F).

Customer Programmable Values Preset At The Factory

ITW Dynatec can set the controller’s system values to customer’s specs, if provided.

If customer’s specs are not provided, the following values will be entered into the DynaControl controller at the factory. They may be changed by reprogramming through the keypad. (These are not the “default” settings, see following section).

- Applicator (head) and hose setpoints: varies from 138 to 149°C (280 to 300°F).

- Hopper setpoint: 143°C (290°F).

- All zones are switched off, except for the hopper and the optional drop-in grid.

- Motor rpm: 0 in the “OFF” mode.

- Standby: 80°C (140°F) under setpoint.

- Hi and low alarms: ± 12°C (20°F) from setpoint.

- Pump enable temperature: 132°C (270°F).
Default Settings of the DynaControl Controller

Default settings are the manufacturer’s preset values to which the system will return if the DynaControl is subjected to an internal memory reset (also referred to as a “re-boot”). While you can change your programmed values to anything within the system’s limits, the default settings cannot be changed.

**Defaults**

- Language: English
- Setting for Customer Access Code: “9999”.
- Temperature setpoint for each zone: - - - -
- Hopper ready temperature: 135°C (270°F).
- Over-temperature limit: Your chosen setpoint limitation + 10°C or F. For example: if your setpoint limitation is 218°C (425°F), then your over-temp limit = 228°C (435°F).
- Standby temperature for all zones: 80°C (140°F) lower than programmed setpoints.
- Hi/lo limit deviation for all temperature zones: ± 20°C (36°F).
- Temperature zone offset: 0°C (0°F).
- Sequential heating: first hopper zones, then hose/ head zones and auxiliary zones.
- Setpoint limitation: 218°C (425°F).
- Minimum pump speed: 0% of full speed.
- Maximum pump speed: 100% of full speed.
- Proportional Integral values (P-I values): for Premelt, Hopper and Filterblock temperature zones, P = 15 and I = 3. For all other zones, P = 12 and I = 2.
Helpful Tips for the User

• When the ASU is turned ON, all temperature setpoints and other operating parameters will be exactly where they were when the ASU was turned off.

• When the ASU is turned ON, all system heaters go ON if the automatic heater startup is enabled and if setpoints are programmed unless sequential heatups have been set. However, if hopper temperature is above ready temperature when the ASU is turned ON, all hose and head sequential heatups will be bypassed and hoses and heads will be turned ON.

• If the system is turned OFF and then ON again, the standby condition will be disabled.
Serial Protocol for RS232 and RS485 Options, V5.00 d & up

Specifications
- RS232C, no handshake
- RS485, 4 wires
- baud rate 1200...57600 baud
- character format 8 databits + 1 startbit + 1 stopbit
- parity: no parity check

General Information
- DynaControl is always slave. The controller is only reacting when addressed by a master.
- DynaControl is only responding when own slave address is received.
  Slave address is programmable via front panel (PC-LINK Setup).
- Multi-digit values are transferred most significant digit first, each digit is ASCII coded.
- Used control characters:
  - **STX** 02 Start of Text
  - **ETX** 03 End of Text
  - **EOT** 04 End of Transmission
  - **ENQ** 05 Enquiry
  - **ACK** 06 Positive Acknowledge
  - **NAK** 15 Negative Acknowledge

Structure of commands
- Master transmits to DynaControl:
  - EOT, addr, opcode, 0..n data bytes, ENQ
- DynaControl responds:
  - STX, 1...n data bytes, ETX

Address Setting
Each telegram sent to the DynaControl contains the slave address.
DynaControl is only responding if the received address matches the programmable address.

Examples:
Controller address = 37

1. Write temperature setpoints
   Zone 3 = 250 °F
   Zone 4 = 280 °F
   Zone 5 = 300 °F
   Zone 6 = 350 °F, but temporarily not in use
   EOT, 3, 7, F, 0, 3, 0, 2, 5, 0, 0, 2, 8, 0, 0, 3, 0, 0, 1, 3, 5, 0, ENQ
   | 37 | 3 | 250 | 280 | 300 | 350 / Off |
   note: adding 1000 to the setpoint will deactivate this zone.

2. Read actual temperatures
   EOT, 3, 7, d, 0, 0, ENQ
   | 37 | 00 |
   note: zone number 00 will request information of all available zones
Return String:
STX, 0, 2, 3, 5, 0, 2, 4, 4, 1, 9, 9, 0, 2, 3, 5 ...........ETX
-> zone 1 is 235_F, zone 2 is 244_F, zone 3 has no sensor attached ....

Note: 1999 indicates open sensor, 0999 indicates sensor short circuit

3. Read actual pump speed
EOT, 3, 7, e, 0, 0, ENQ  request the speed of all pumps
Return String:
STX, 0, 8, 5, 0, 0, 6, 6, 4, ETX
-> System has 2 pumps, pump1: 85.0Rpm, pump2: 66.4Rpm

4. Read System Status
EOT, 3, 7, f, ENQ
Return String:
STX, F, ETX  -> ‘F’ = 46hex

Bit wise:  0  7  16  05  04  03  12  11  00
Always!

No setback, normal mode
Controller is on
Enable thermostat closed
Hopper not empty
No low temper.
No high temper.  = Ready

5. Read status of all temperature zones
EOT, 3, 7, 1, 0, 0, ENQ
Return String:
STX, 0, 2, 2, 3, 1, 1, 7, 7, ........ETX
è zone 1: is not used (0)
è zone 2&3: heating, but below setpoint window (2)
è zone 4: heating and ready (3)
è zone 5&6: waiting due to heat up sequence (1)
è zone 7&8: no sensor attached (7)

cont.
<table>
<thead>
<tr>
<th>Opcode</th>
<th>Parameter Syntax*</th>
<th>Return String</th>
<th>Function</th>
<th>Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x41 / 'A'</td>
<td>zz,n*dddd</td>
<td>ACK / NAK</td>
<td>write temperature setpoints °C (10 to 232), will switch to Celsius</td>
<td>1 zone / multiple zones</td>
</tr>
<tr>
<td>0x46 / 'F'</td>
<td>zz,n*dddd</td>
<td>ACK / NAK</td>
<td>write temperature setpoints °F (50 to 450), will switch to Fahrenheit</td>
<td>1 zone / multiple zones</td>
</tr>
<tr>
<td>0x61 / 'a'</td>
<td>zz.ddd (n*ddddd)</td>
<td></td>
<td>read temperature setpoints</td>
<td>1 zone / all zones</td>
</tr>
<tr>
<td>0x64 / 'd'</td>
<td>zz.ddd (n*ddddd)</td>
<td>read actual temperature (1999 = open sensor, 0999 = shorted sensor)</td>
<td>1 zone / all zones</td>
<td></td>
</tr>
<tr>
<td>0x42 / 'B'</td>
<td>zz.n*dd</td>
<td>ACK / NAK</td>
<td>write temperature tolerance window (5 to 50 degree)</td>
<td>1 zone / multiple zones</td>
</tr>
<tr>
<td>0x62 / 'b'</td>
<td>zz.dd (n*dd)</td>
<td>read temperature tolerance window</td>
<td>1 zone / all zones</td>
<td></td>
</tr>
<tr>
<td>0x43 / 'C'</td>
<td>zz,n*ddddd</td>
<td>ACK / NAK</td>
<td>write pump speed setpoint (0.0 to 100.0%)</td>
<td>1 pump / multiple pumps</td>
</tr>
<tr>
<td>0x63 / 'c'</td>
<td>zz.ddd (n*ddddd)</td>
<td>read pump speed setpoint (0.0 to 100.0%)</td>
<td>1 pump / all pumps</td>
<td></td>
</tr>
<tr>
<td>0x65 / 'e'</td>
<td>zz.ddd (n*ddddd)</td>
<td>read actual pump speed (0.0 to 150.0 Rpm)</td>
<td>1 pump / all pumps</td>
<td></td>
</tr>
<tr>
<td>0x66 / 'l'</td>
<td>zz.ddd (n*ddddd)</td>
<td>read line speed input (0.0 to 100.0%)</td>
<td>1 pump / all pumps</td>
<td></td>
</tr>
<tr>
<td>0x67 / 'g'</td>
<td>zz.ddd (n*ddddd)</td>
<td>read pressure transducer (0.0 to 150.0BAR / 0 to 1500PSI, 2000= open transd.)</td>
<td>1 transducer / all transd.</td>
<td></td>
</tr>
<tr>
<td>0x50 / 'P'</td>
<td>zz.n*ddddd</td>
<td>ACK / NAK</td>
<td>write pressure alarm value (0.0 to 150.0BAR / 0 to 1500PSI)</td>
<td>1 transd. / multiple transd.</td>
</tr>
<tr>
<td>0x70 / 'p'</td>
<td>zz.ddd (n*ddddd)</td>
<td>read pressure alarm value (0.0 to 150.0BAR / 0 to 1500PSI)</td>
<td>1 transducer / all transd.</td>
<td></td>
</tr>
<tr>
<td>0x4d / 'M'</td>
<td>zz.n*d</td>
<td>ACK / NAK</td>
<td>write pump mode ('S'=Stop, 'M'=Manual, 'A'=Automatic)</td>
<td>1 pump / multiple pumps</td>
</tr>
<tr>
<td>0x6d / 'm'</td>
<td>zz.n*d</td>
<td>read pump mode ('S'=Stop, 'M'=Manual, 'A'=Automatic)</td>
<td>1 pump / all pumps</td>
<td></td>
</tr>
<tr>
<td>0x66 / 't'</td>
<td>n.a.</td>
<td>sys-data 1</td>
<td>read system status 1 (see note 1)</td>
<td></td>
</tr>
<tr>
<td>0x6a / 'j'</td>
<td>n.a.</td>
<td>sys-data 2</td>
<td>read system status 2 (see note 2)</td>
<td></td>
</tr>
<tr>
<td>0x69 / 'i'</td>
<td>zz.n*d</td>
<td>read status of temperature zone (see note 3)</td>
<td>1 zone / all zones</td>
<td></td>
</tr>
<tr>
<td>0x48 / 'H'</td>
<td>d</td>
<td>ACK</td>
<td>set system mode (see note 4)</td>
<td></td>
</tr>
<tr>
<td>0x52 / 'R'</td>
<td>d</td>
<td>ACK / NAK</td>
<td>set active program number (1 to 4)</td>
<td></td>
</tr>
<tr>
<td>0x72 / 'r'</td>
<td>n.a.</td>
<td>d</td>
<td>read active program number (1 to 4)</td>
<td></td>
</tr>
<tr>
<td>0x4c / 'L'</td>
<td>n.a.</td>
<td>ACK / NAK</td>
<td>reset error message</td>
<td></td>
</tr>
</tbody>
</table>

*1: System status: Bit0=Setback active, Bit1=Controller on, Bit2= Enable thermostat active, Bit3= Low Level, Bit4= Low Temp., Bit5=High Temp., Bit6= always 1
*2: System status: Bit0= scheduler active, Bit6= always 1
*3: Zone status: 0=off, 1=wait, 2= heat up, 3= ready, 4= low temp., 5= high temp. , 6= sensor short circuit, 7= sensor open
*4: System mode: Bit0= SetbackOn/Off, Bit1= Heat up sequence yes/no, Bit2= Scheduler active yes/no, Bit3= controller On/Off

*: zz: zone number 01 to max. or 00 for all zones, dddd: four digit data, dd: two digit data, d: one digit data or character
Chapter 5
PROGRAMMING INSTRUCTIONS
FOR DynaControl™ CONTROLLER WITH EXPANDED KEYPAD V.5.00c & UP

Controller Safety Consideration

DANGER HIGH VOLTAGE
Never open the control panel without switching off the main disconnect switch to ensure that it is disconnected from its power source.
The printed circuit boards should always be carefully removed. DO NOT handle the boards except by their edges. Read the section on PCBs in Chapter 7 of this manual for further cautions.

Software Version
You can determine the software version of your controller by noting it when it comes up on the Help Screen or on the display at startup:

***ITW Dynatec***
M-Control V 5.00c

Current Software Version
Display & Keypad Reference

**Display & Function Keypad**

*Actual Temps Screen shown as example*

- **System Status:** Ready, Heat up, Alarm, Standby
- **Scheduler Active Indicator**
- **Day of Week**
- **Time of Day**
- **Scheduler Key:**
  - Standby
  - Day/Date Clock
  - 7-Day Scheduler
  - Program Recipes
- **Service Key**
- **On/Off Key & LED**

**Numeric Keypad**

- **Symbol = use to enter a space, colon, dash, dot, “Q” or “Z” into text**
- **%” or “RPM” if optional actual RPM readout is installed**
- **Press Enter to activate or confirm**
- **1, 2, 3 Press Enter to activate or confirm**
- **Enter a numeric value with 0 - 9 keys**
- **Enter a letter on the alpha-numeric**
- **This item or this screen is locked**
- **This item is factory setup* only**
- **< > Press button C to see more zones**

**HELP Screen (F4 on Actual Temperatures Screen)**

- **Flashing “C” indicates optional serial communication (PC Link) is ON**
- **Current software version**

*Factory Setup = can be modified by ITW Dynatec’s technicians only*
Display Reference, cont.

- **System Status Line**: The top line of the display indicates the system status, such as "Alarm Lo".
- **Zone Names**: The names of the zones are displayed below the setpoint entries.
- **Information Lines**: These lines provide additional information like setpoint values and zone status.
- **Function Keys**: The function keys include scroll up, down, or right, "return" to the last screen, go to "pressure" and "pump" screens, toggle "on/off", "all _ _ _" for all in category, "ABC/abc" for letter case, "clear" to clear an alarm or message, "copy" to copy word(s) to a clipboard, and "paste" to paste copied words into text.
- **Setpoint Programming Screen**: This screen allows programming of setpoints for various zones.
- **Pump Programming Screen**: This screen allows programming of pump modes and settings.

For illustrations of the screens of the Dual Hopper ASUs, see pages 5-28 & 29.
Basic Programming Sequence: Quick Reference

Follow the screen-by-screen steps outlined in the remainder of this chapter for complete setup and programming instructions. Thereafter, use this page as a “quick reference”.

Press

- Turn Controller On
- x2, 6 Language Selection
- x1, 8 Temperature Scale Selection

F4

Actual Temperatures:
- To Program Setpoints
- To Program Pump/Motor(s)
- To Program Optional Clutch(es)
- To Program Optional Pressure Transducers

F3

Service Page 1:
- 1 = High Low Temperature Deviation
- 2 = Setback Temperature
- 3 = Setback/Sleep Setup
- 4 = Setpoint Limitation
- 6 = Temperature Offset
- 7 = Sequential Heating
- 8 = Temperature Scale
- 9 = Change Security Lock or Access Code

F1

Service Page 2:
- 1 = Customer Zone Names
- 2 = Power On Configuration
- 3 = Factory Defaults
- 4 = Keypad Locking
- 5 = PC Link
- 6 = Language
- 7 = LCD Contrast
- 8 = System Logbook
- 9 = Change Security Lock

To Program Scheduler
- 1 = Manual Standby Activation
- 2 = Time & Date Clock
- 3 = Program 7-Day Scheduler
- 4 = Select Program Recipes
- 5 = Manual Scheduler Activation

To Program Optional Memory Card

End
Controller Setup

Below is the step-by-step process of setting up the controller.

Note: Whenever an Access Code is required, enter your individual code. The default code is 9999. If you have lost your code, call ITW Dynatec Customer Service: 1-800-538-9540 (in the USA) or contact your local representative.

Turn the Controller ON
Turn the controller ON using the ASU's main On/Off switch.

Language Selection
English is the default language. If you desire another language (choices are German, French, Italian, Spanish, Swedish, Portuguese, Japanese and Dutch), make your selection:

Press the Service Key twice to advance to Service Page 2.

Press #6 on the numeric keypad, followed by Enter.

Press the numeric key of your language choice, followed by Enter.

(OR Scroll to your choice, then press Enter.)

Note: To quickly return to the English language, turn the controller OFF. Then press both Enter and “9” and hold while turning the controller ON.

Temperature Scale Selection

Press the Service Key twice to advance to Service Page 1.

Press #8 on the numeric keypad, followed by Enter.

Toggle to make your choice between °C scale or °F scale. Press Enter.

Press Return (F4) to Go to the Actual Temperatures Screen
Actual Temperatures Screen

The Actual Temperatures Screen serves as the controller’s main menu. From here you can go to any other screen. The Actual Temperatures Screen is also the most useful screen to display for monitoring purposes.

Use of the Actual Temperatures Screen

<table>
<thead>
<tr>
<th>Press This Function Key</th>
<th>To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>On/Off</td>
<td>Toggle display, pumps and heaters power ON or OFF</td>
</tr>
<tr>
<td>Setpoints (F1)</td>
<td>Go to the setpoints programming screen</td>
</tr>
<tr>
<td>Pumps (F2)</td>
<td>Go to the pumps programming screen</td>
</tr>
<tr>
<td>Pressure (F3)</td>
<td>Go to the pressure screen</td>
</tr>
<tr>
<td>Help (F4)</td>
<td>Go to the Help screen.</td>
</tr>
<tr>
<td>Service</td>
<td>Go to the first of the three service screens</td>
</tr>
<tr>
<td>Scheduler</td>
<td>Go to the Main Scheduler screen</td>
</tr>
</tbody>
</table>
Use of the Actual Temperatures Screen, cont.

Programming Sequence (details on following pages)
1. Press Setpoints. After programming all of your temperature setpoints, return to the Actual Temperatures Screen.
2. Press Pumps. After programming all pumps and optional clutch(es), return to the Actual Temperatures Screen.
3. Press Pressure if optional pressure transducers are installed on ASU. After setting limits for all pressure transducers, return to the Actual Temperatures Screen.
4. Press Scheduler Key to program the following functions: Standby, Time & Date Clock, 7-Day Scheduler and/or Program Recipes.
5. Press Help to view the Help screen (illustrated on page 5-2).

Monitoring:
1. System Status display describes system status as one of the following:
   a. System Heat up: power is ON but zone temperatures have not risen to setpoint range.
   b. System Ready: all zones have reached setpoint temperatures.
   c. Alarm: a temperature zone is out of its setpoint tolerance range. An overtemp alarm is indicated by an upwards arrow next to a temperature. An undertemp alarm is indicated by a downwards arrow next to a temperature.
   d. Alarm Lo: the pump enable thermostat (undertemp thermostat) is preventing operation due to a low temperature condition.
   e. Standby: the system is in a programmed standby state.
2. Actual Temperatures or Zone Status of all zones is displayed:
   a. ###: a three-digit number indicates a zone’s actual temperature.
   b. HOLD: zone is waiting for release. Temperatures have not risen to setpoint range.
   c. Arrow up: zone is over temperature.
   d. Arrow down: zone is under temperature.
   e. ?: there is no sensor. Zone needs troubleshooting.
   f. >: there are more temperature zones not seen on the current display. To view them, press C on the numeric keypad (bottom row, first key).
3. 7-Day Scheduler Active display shows that the 7-Day Scheduler is programmed and in use.
4. Pump Info Lines indicate pump mode (“Auto” on the illustration on page 5-6) and external reference percent or set speed percent.
5. If the optional Actual RPM display (shown on page 5-3) is installed, actual pump rpm may be monitored.
Setpoints Programming Screen

SYSTEM: Alarm Lo Tue. 3:36 PM
SETPOINTS °F Next Page Press C

1. Premelt 300 300 3. Premelt 300 300
2. Progmelt 350
3. Filterblock 380

INFO: UPPER PREMELT GRID Zo: 1
Set: 300°F Act: 300°F Tol:±30°F

Zone Info Lines
Controller identification number for zone
Use of the Setpoints Programming Screen

Each of the temperature zones is programmed individually by using the function keys as follows:

<table>
<thead>
<tr>
<th>Press This</th>
<th>Function Key</th>
<th>To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scroll Up, Down or Right (F1, 2, 3)</td>
<td>Return (F4)</td>
<td>Select each zone’s setpoint</td>
</tr>
<tr>
<td>(Enter)</td>
<td>All - - - (F1)</td>
<td>Return to the Actual Temperatures Screen</td>
</tr>
<tr>
<td>On/Off (F3)</td>
<td>Eliminate an error message or alarm</td>
<td></td>
</tr>
</tbody>
</table>

Programming
1. Scroll to the first temperature zone setpoint you desire to program.
2. On the numeric keypad, enter the desired setpoint value.
3. Press Enter.
4. Scroll to the next setpoint to be programmed and repeat steps 2 and 3.

Notes:
- To turn a zone OFF: scroll to zone, press Enter to select, press ON/OFF (F3).
- When turning a switched-off zone back ON, it will retain its previous setpoint.
- To change all zones in a category (ie, all hoses, all heads, etc.): scroll to one item in that category, enter desired value, then press F1 (this does not apply to zones which are turned OFF).

Monitoring
1. “Zo #”: the number which appears here is the controller’s identification number for this zone. This number cannot be changed by user.
2. The Zone Info Lines indicate the user-defined zone name (programmed on Service Page 2, menu item 1), the zone’s setpoint, the zone’s actual temperature, the zone’s tolerance (programmed on Service Page 1, menu item 1) and the zone’s identification number.
Pump Programming Screen

Optional RPM Display

<table>
<thead>
<tr>
<th>Pump Mode</th>
<th>Set %</th>
<th>Min %</th>
<th>Max %</th>
<th>Actual RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 MANU.</td>
<td>78.0</td>
<td>5.0</td>
<td>80.0</td>
<td>RUN 90.5</td>
</tr>
<tr>
<td>2 AUTO</td>
<td>5.0</td>
<td>5.0</td>
<td>87</td>
<td>RUN 87</td>
</tr>
<tr>
<td>3 STOP</td>
<td>1.0</td>
<td>1.0</td>
<td></td>
<td>HOLD</td>
</tr>
</tbody>
</table>

INFO: RIGHT PUMP

Mtr 1

System: Ready Tue. 3:36 PM

Press Enter and Select Mode

MANUAL AUTOMATIC STOP RETURN

F1 F2 F3 F4

Alternative programming function keys:

▼ ▲ STOP ALL RETURN

CLUTCHES RE-START
Use of the Pump(s) Programming Screen

Each of the pump(s) is programmed individually by using the function keys as follows:

<table>
<thead>
<tr>
<th>Press This</th>
<th>Function Key</th>
<th>To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scroll Up or Down (F1, 2)</td>
<td>Select a pump.</td>
<td></td>
</tr>
<tr>
<td>Stop All (F3)</td>
<td>To stop all pumps in system</td>
<td></td>
</tr>
<tr>
<td>Re-Start (F4)</td>
<td>To re-start all pumps</td>
<td></td>
</tr>
<tr>
<td>Manual (F1)</td>
<td>Choose Manual Mode for the selected pump</td>
<td></td>
</tr>
<tr>
<td>Automatic (F2)</td>
<td>Choose Automatic Mode for the selected pump</td>
<td></td>
</tr>
<tr>
<td>Stop (F3)</td>
<td>Choose Stop Mode for the selected pump</td>
<td></td>
</tr>
<tr>
<td>Clutches (F2)</td>
<td>Go to the Clutch Programming Screen (if clutches are installed)</td>
<td></td>
</tr>
<tr>
<td>Return (F4)</td>
<td>Return to the Actual Temperatures Screen</td>
<td></td>
</tr>
<tr>
<td>(Enter)</td>
<td>Enter a numeric value</td>
<td></td>
</tr>
</tbody>
</table>

Programming
1. Scroll to select a pump. Press Enter.
3. If in Manual mode, enter pump speed ##.# in the Set % column:
   a. Use numeric keypad to enter desired rpm value.
   b. Press Enter.
4. If in Automatic:
   a. Scroll to Min % to program minimum pump speed. Enter value as described above.
      Note: typically, at 0 volts, this value will be between 0 and 10% (default = 0%).
   b. Scroll to Max % to program maximum pump speed. Enter value as described above.
      Note: typically, at 10 volts, this value will be between 0 and 100%, depending on motor installed on ASU (default = 100%).
5. Scroll to select next pump to be programmed. Repeat steps 2 thru 5 until all pumps are programmed.
6. If clutches are installed on ASU, Press Clutches (F2) to program (see next page).

Monitoring
1. RUN indicates the pump/ motor is enabled.
2. HOLD indicates that the controller is preventing the pump/ motor from running, due to a low temperature, a standby condition, etc.
3. The Info Line indicates the user-defined name for the selected pump (programmed on Service Page 2, menu item 1).
4. If the optional Actual RPM display is installed, actual pump rpm may be monitored. With this option, the RUN/HOLD column is eliminated. The Actual RPM display is also seen on the Actual Temperatures Screen.
Optional Clutch Programming Screen

The Clutch screen is active, as a subset of the Pump Programming Screen, only if clutches are installed on your ASU. It is reached by Pressing F2 “Clutches” on the Pump Screen (seen on previous pages).

The number of clutches on the ASU will equal the number of motors:

For DM 35: there is a maximum of two pumps/ clutches
For DM 70/140: there is a maximum of four pumps/ clutches
For DM 210: there is a maximum of six pumps/ clutches

<table>
<thead>
<tr>
<th>Switch Clutches ON/OFF with button 1 . . 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump - Clutch 1</td>
</tr>
<tr>
<td>Pump - Clutch 2</td>
</tr>
<tr>
<td>Pump - Clutch 3</td>
</tr>
<tr>
<td>Pump - Clutch 4</td>
</tr>
<tr>
<td>Pump - Clutch 5</td>
</tr>
<tr>
<td>Pump - Clutch 6</td>
</tr>
</tbody>
</table>

Turn Clutch ON/OFF using numeric keys 1 thru 6
Use of the Optional Clutch Programming Screen

<table>
<thead>
<tr>
<th>Press This</th>
<th>Function Key</th>
<th>To:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Re-start (F2)</td>
<td>Turn ON all clutches at once</td>
</tr>
<tr>
<td></td>
<td>Stop All</td>
<td>Turn OFF all clutches</td>
</tr>
<tr>
<td></td>
<td>Return (F4)</td>
<td>Return to the Pump Screen</td>
</tr>
</tbody>
</table>

Programming
1. To turn individual clutches On or Off, toggle individually on the numeric keypad.

Monitoring
1. On/Off status of each clutch is indicated.

Optional Pressure (PSI/ BAR) Programming Screens

The two Pressure Programming screens are active only if pressure transducers (sensors) are installed on your ASU. They are reached by Pressing F3 “Pressure” on the Actual Temperatures Screen.

The number of pressure transducers on the ASU will vary per ASU:
- For DM 35: there is a maximum of four pressure transducers
- For DM 70/140: there is a maximum of eight pressure transducers
- For DM 210: there is a maximum of twelve pressure transducers

Pressure Screen #1

```
SYSTEM: Ready Tue. 3:36 PM
Pressure Sensor | PSI (BAR) | Sensor Act. |
----------------|----------|-------------|
1               | 100      | Pre Filter Pump 1 |
2               | 100      | Post Filter Pump 1 |
3               | ?        | Pre Filter Pump 2 |
4               | 100      | Post Filter Pump 2 |
```
Optional Pressure (PSI/ BAR) Programming Screens, cont.

Pressing “Setup” (F3) on Screen 1 brings up a message screen:

```
Access Code: __________

Pressure Sensor Type: max. _______ PSI/BAR
Bar/PSI Calibrat. RETURN

System depressurized?

CONFIRM RETURN
```

### Pressure Screen #2

**SYSTEM:** Ready Tue. 3:36 PM

<table>
<thead>
<tr>
<th>Pressure Sensor</th>
<th>PSI (BAR) Act.</th>
<th>Alarm Low</th>
<th>PSI (BAR) High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>10</td>
<td>500</td>
</tr>
<tr>
<td>2</td>
<td>100↑</td>
<td>10</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>?</td>
<td>10</td>
<td>500</td>
</tr>
<tr>
<td>4</td>
<td>100↓</td>
<td>110</td>
<td>500</td>
</tr>
</tbody>
</table>

-F1- F2- F3- F4-
Use of the Optional Pressure Programming Screens

<table>
<thead>
<tr>
<th>Press This Function Key</th>
<th>To:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pr. Limits (F2)</td>
<td>Go to Pressure Screen #2 to set low and high alarms</td>
</tr>
<tr>
<td>Setup - (F3)</td>
<td>Enter access code in order to advance to calibration</td>
</tr>
<tr>
<td>Return (F4)</td>
<td>Return to the Actual Temperatures Screen</td>
</tr>
<tr>
<td>Scroll Up or Down (F1 or F2)</td>
<td>Select each sensor (transducer)</td>
</tr>
<tr>
<td>Hi &lt;-&gt; Lo ((F3)</td>
<td>Select the screen’s high or low column</td>
</tr>
<tr>
<td>Bar/PSI (F1)</td>
<td>Choose pressure scale</td>
</tr>
<tr>
<td>Calibrat. (F2)</td>
<td>Calibrate all transducers</td>
</tr>
</tbody>
</table>

**Programming**
1. The names of the pressure transducers (shown on the preceding page as “Pre Filter Pump 1”, etc.) are programmed at Service Page 2, Function #1 (see page 5-19).
2. On Pressure Screen #1, press Pr. Limits (F2) to advance to Pressure Screen #2. Use the Scroll keys to select a Low or High limit for the first pressure transducer (sensor) to be programmed. Use the numeric keypad to enter your desired value. Press Enter. Repeat until all desired pressure transducers are programmed with Low and High pressure limits. Use Hi <-> Lo (F3) to move between columns as necessary.
3. Press Return (F4) to return to Pressure Screen #1. Press Setup (F3). On the first message screen, enter your four-digit access code. On the second message screen, enter the maximum Bar/PSI value of the pressure transducer(s) installed on your ASU.
4. Press Bar/PSI (F1) to choose display in Bar or PSI.
5. Press Calibrat (F2) to calibrate all the pressure transducers installed. The controller will ask, “System depressurized ?”, press Confirm (F3).

**Note:** Before confirming, verify that all transducers are at “0” pressure. Pumps must be turned OFF and time allowed for system pressure to drop to “0”.

The controller will display “Waiting”. After a few seconds, the Pressure Screen will appear and, in its last column, will list if each pressure transducer has “Passed” or “Failed” the calibration. (Note: "Failed" indicates a problem with the transducer or the Pressure PCB.)
6. Press Return (F4) to return to Pressure Screen.
7. Press Return (F4) again to return to Actual Temperatures Screen.

**Monitoring**
1. Actual pressure values may be monitored for each transducer on either screen.
2. Over pressure ↑ or Under pressure ↓ arrows indicate conditions.
3. A question mark ? indicates that no transducer is installed, or that installation is not complete for this transducer position.
Service Functions Screens

The three Service Function Screens are designated Service Page 1, Service Page 2 and Service Page 3. They are accessed by pressing the Service Key 1, 2 or 3 times.

Functions coded -- are active and require no code to program.

Functions coded with a key  are locked and require entry of a code before programming. For example, as seen on the diagrammed screen below, Setpoint Limitation is locked from further programming.

Functions coded  are ITW Dynatec factory setups and are not user accessible.

Program the Service Functions as described on the following pages. Many functions are programmed simply by a toggle or by a single numeric entry.

Service Page 1
**Service Functions Screens, Page 1 cont.**

**Function #**

**Press #1** to program High/ Low Temperature Deviation. Enter a numeric value for the first zone selected. Press Enter to confirm. Scroll to next desired zone and repeat until all zones are programmed. Then Press Return (F4) to return to menu. Note: after entering one value in any category, you may press All xxx. (F1) to change all the items in that category.

The High/ Low Temperature Deviation is a range (±) representing the high and low temperature limits of each setpoint. During operation, these limits activate the error alarm which alert the operator to over-temp and under-temp conditions in the temperature zones. The smallest deviation programmable is ±5°C (±9°F) and the largest is ±50°C.

**Press #2** to program Standby Temperature. Enter a numeric value for each category. Press Enter. Press Return (F4). Note: if the same Standby Temperature is desired for all zones: enter the value in the first row, then press Enter.

The Standby Temperature is a reduction in temperature by which all the temperature zones will be reduced in a standby condition. For example, if the hopper setpoint is 275°C and you program a 100 degree standby temperature, the controller will reduce the hopper temperature to 175°C. Numerically, the controller will accept any standby temperature within the range of -30°C and -150°C (-30°F and -256°F).

**Press #3** to program Standby Time Delay and Sleep Mode. Enter a numeric value for the time delay. Press Enter. Toggle (press F1 or F2) to Sleep Mode. Enter a numeric value for Sleep Mode Delay. Press Enter. Press Return (F4).

The Standby Time Delay allows programming of a delay from the time the “external standby” terminals (for connection, see Chapter 3) are connected until the ASU enters its standby mode. The time delay selected must be in the range from 0:00 (which represents an immediate entry into standby, i.e. no delay) to 18.0 hours.

The Sleep Mode may be activated only during Standby. It becomes activated after a programmed length of time (0.1 to 18.0 hours). During Sleep Mode all heaters are turned OFF and the motors are stopped. The display reads “F1 to Start Heating” when in Sleep Mode. To disable the Sleep Mode, press Disable (F3).

Standby and Sleep Mode work together. For example, if you program a Standby of 1 hour and a Sleep Mode of 3 hours, the ASU enters Standby one hour after the external contact is closed. The ASU enters Sleep Mode three hours after entering Standby.

**Press #4** to program Setpoint Limitation. Enter a numeric value. Press Enter. Press Return (F4).

The Setpoint Limitation is a universal maximum temperature for all temperature zones (i.e., the overtemperature limit). The controller will not allow the operator to program a higher setpoint than the value of the setpoint limitation. The default setpoint limitation is 218°C (425°F). The selectable range for the setpoint limitation is 40°C - 232°C (100°F - 450°F).

Function #5 is not active in the present controller configuration. No programming is possible.
Service Functions Screens, Page 1 cont.

**Press #6** to program Temperature Offset. Enter a numeric value for the first zone selected. Press Enter. Scroll to next desired zone and repeat until all zones are programmed. Press Return (F4). Note: to enter a negative value, enter the value, then press Negative (F3).

The Temperature Zone Offset is a mathematical factor which compensates for differences in temperature between the placement of the system’s heaters and sensors. An offset is often used for large applicator heads, printrolls, printwheels or other custom devices. Usually no offset is required for standard heads. The offset may be programmed up to ±50 degrees (C or F) of the zone’s temperature.

**Press #7** to program Sequential Heating. Scroll to choose one of the three selections: No sequence, First all hopper zones or Hold electric head. Press Confirm (F3).

Sequential heating allows you to choose the heating order of the temperature zones, so that zones requiring more time to heat up to temperature can be programmed to begin heating before others. In the case of the “Hold Electric Head” selection, programming of a reduced temperature for ten minutes allows for the stabilization of the electric valves.

a. A “No sequence” designation means that all temperature zones will begin to heat immediately after the ASU is powered on.

b. “First all hopper zones” means that the hose/ head/ auxiliary zones do not begin heating until all hopper zones have reached the low limit of their setpoints. Zones which are switched OFF are not applicable.

c. “Hold Electric Heads at xxx F for 10 minutes” applies to systems utilizing electric applicators only. After choosing this selection and programming the temperature (to the softening point of your adhesive, see your adhesive manufacturer), the controller holds all electric heads at the operator-selected temperature for ten minutes before releasing them to operating setpoint.

The controller’s default heating sequence for the Dynamelt ASU is first all hopper zones. This allows the larger mass of adhesive in the hopper to begin heating immediately.

**Press #8** to program Temperature Scale. Program directly on the menu screen by pressing #8 key to choose between Centigrade or Fahrenheit. Press Return (F4).

**Press #9** to Change Security Lock for Service Page 1. Enter your access code. Press Enter. Scroll F1 or F2 to select desired function. Press F3 to Lock or Unlock function from programming. Repeat for each desired function.

To Change Your Access Code: Scroll F1 or F2 to select “Change Access Code”. Enter your desired new access code. Press Enter to Confirm. Press Return (F4).

Press Service Key to advance to Service Page 2.
Service Functions Screens, cont.

Service Page 2

Programming of the Service Functions on this screen is similar to the programming of Page 1.

Press #1 to program Customer Zone Names. This function allows the programmer to enter his desired name for each temperature zone, pump, and (optional) pressure transducer. This up-to-20-character name will be the name displayed in the controller’s Info Lines. Program following these rules:

a. use the Alpha/Numeric keypad to enter letters and numbers. When entering letters, use one, two, or three presses of a key to distinguish between the letters. Press Enter after each desired letter or number is in place.
b. press the 0 (zero) key to toggle from letters to numbers,
c. press the SYM key to enter a space, colon, dash, dot, “Q”, “Z” or other special characters,
d. press F1 to toggle from upper to lower case,
e. you cannot back up. If an error is made, press Enter repeatedly to advance through the name loop until you reach the point for correction and re-write as desired,
f. press CLR LINE to clear an entire line,
g. you may COPY (F2), PASTE (F3) and then modify to save time when names are similar,
h. press F4 to advance to the next motor or zone to be named.

To program Customer Zone Names: Press F1 to program Temperature zones, F2 to program Pumps or F3 to program Pressure Transducers. Scroll to the first item to be named. Press Enter to allow naming. Using the Alpha/Numeric keypad and following the rules given above, spell out name as desired. Press F1, F2 or F3 to select another item to name. Repeat until all items are named as desired. Press F4 again to Return to Service Page 2 screen.

Press #2 to program Power On Configuration. This function gives the user the choice of having the heaters and pumps come on (or remain off) whenever the ASU is powered on. USA default is both On. European default is Heaters On, Pumps Off. Note: programming here overrides programming made at the next Service Function (Function #3 Factory Defaults).

Press 1 to toggle the heaters On or Off. Press 2 to toggle the pumps On or Off. Press 3 to toggle the external inputs On or Off. Note: if you select heaters Off, the controller will remind you, at power on, to press F1 to turn the heaters On.
Service Functions Screens, Page 2 cont.

Press #3 to program Factory Defaults.

CAUTION: Factory Default programming is not essential. If done improperly, it can cause re-pro-
gramming of setpoints to be necessary. If you are satisfied with your ASU’s setup, you may leave
Factory Defaults unprogrammed.

Upon entering this screen, the “ASU Type” (model) of your melter will be displayed. Use this
screen to program the quantity of hoses, quantity of premelt grids and quantity of pumps installed
on your ASU, if desired. It is o.k. to leave these items unchanged or with “?” selected.

Scroll (F1) to the line you wish to amend (ie, hose, premelt, pump). Press Change (F2) repeatedly
to view the list of possibilities for this line. Press Change until your desired quantity is displayed.
Repeat until all lines are programmed.

Then, Scroll (F1) to Configure EU/US. Press Change (F2) to toggle between EU Setup or US
Setup for setpoints and parameters* if required.

Press Load (F3). Then press Confirm (F1). Press Return (F4) to return to menu.

*Choosing EU or US reloads all factory setpoints and parameters as follows:
EU (European) Setup = Temperature scale is Centigrade, pressure is measured in BAR, pumps are
in STOP mode at startup and heaters are active at startup.

US (United States) Setup = Temperature scale is Fahrenheit, pressure is measured in PSI, pumps
start in the mode they were left in at shutdown and heaters are active at startup.

Press #4 to program Keypad Locking. Scroll to either Temperature Settings or Pump Settings.
Press F3 to toggle Locked or Free. Scroll to other setting and press F3 to toggle Locked or Free.
Press F4 to Return to menu.

Selecting Locked prevents further programming to either temperature setpoints or pumps. Select-
ing Free allows further programming.

Press #5 to program optional PC Link (serial communication). Scroll to select either:
“Load: from Computer to this Controller” or
“Save: From this Controller to Computer.

Press F1 to Load. Press F2 to Save. Press F3 to Configure BA UD rate or FIFO. The message
“Waiting” indicates the controller/ computer is processing data. The message “Transmission
Done” indicates the computer/ controller has completed transmission. Press F4 to Return to menu.

The DynaControl is capable of bi-directional data transfer of all system parameters to a remote
computer. If this option is installed on your ASU, program it at this step. To program your remote
computer, see page 5-27. When PC Link is installed and the external serial communication is ON,
a flashing “C” appears at the upper right of the HELP screen.

Press #6 to program Language. Scroll to desired language. Press F4 to Return to menu.

Press #7 to program LCD-Contrast. Press F1 (+) to increase contrast or F2 (-) to decrease contrast
of display. Press F4 to Return to menu.
Service Functions Screens, Page 2 cont.

Press #8 to program System Logbook. The System Logbook has the following functions:

1. System Logbook: a list of the last 1,000 controller events. Use F1 and F2 to move forward or backward thru the logbook. Use F3 Configuration to choose to log “all system data” or “errors only”.

2. Data Logger: a list of the last 1,000 lines of actual temperatures for up to five selected zones. The time interval at which these temperatures are recorded is programmable. The first screen of the Data Logger is the actual data list. Move through the data by pushing F1 Forward or F2 Backward. To program, press F3 Configure. The Data Logger programming screen is seen below. Use the arrows to select a desired function. Use the numeric keypad to enter zone numbers or the time interval (in 1/10ths of a minute). Press Enter to confirm your choices. Toggle to select Mode.

3. Elapsed Hours: the number of hours that the system has been running. Not resettable.

Press #9 to Change Security Lock for Service Page 2. Enter your 4-digit access code. Press Enter. Press F1 or F2 to select desired function. Press F3 to Lock or Unlock function from programming. Repeat for each desired function. Press Return (F4). Press Return (F4) again to go to Actual Temp Screen.

Service Page 3
All of the functions on Service Page 3 are ITW Dynatec-accessible only. No operator programming is possible.
Programming at Main Scheduler Screen

The Main Scheduler Screen functions include Standby, Date & Time Clock, 7-Day Scheduler and Program Recipes.

Press the Scheduler Key to advance to the Main Scheduler Screen.

Main Scheduler Screen
Use of the Main Scheduler Screen

Function #

Press #1 to manually activate or deactivate Standby. Press F4 to return to the Main Scheduler screen. Note: use of this key will override a programmed Standby.

Press #2 to program the time-of-day and date-of-year clock. Press F1 or F2 to change a selected item, press F3 to select another item. Press Press F4 to return to the Main Scheduler screen.

Press #3 to program the 7-Day Scheduler. See programming details and screen on following page.

Press #4 to select an active recipe (1-4). Use F1 or F2 to select recipe #1, 2, 3 or 4. Press F3 to Confirm. Press F4 to return to the Main Scheduler screen.

Up to four separate setpoint recipes (programs) can be programmed and stored in the controller, though only one recipe is active at any given time. Setpoints may differ from one recipe to another. When switching between recipes, the new recipe's setpoints take over, so there may be error alarms if the new recipe's unused temperature zones are turned on.

The program recipes are referred to as: Recipe 1, Recipe 2, Recipe 3 and Recipe 4.

To create a Recipe: advance to the Main Scheduler Screen and press #4. Use F1 or F2 to choose a recipe number (for this example, say #2). Press F3 to confirm. Press F4, then press F4 again to go to the Actual Temperatures Screen. Program all controller setpoints and functions as outlined on page 5-4. When all programming is completed, Recipe #2 is created.

Press #5 to activate or deactivate the 7-Day Scheduler. Press F4 to return to the Main Scheduler screen.

Press F4 to return to the Actual Temperatures Screen.

Shortcuts
1. To activate or de-activate the Scheduler from the the Actual Temperatures Screen (Main Menu): toggle by pressing and holding the Service (wrench) Key for five seconds.

2. To activate or de-activate Standby from the the Actual Temperatures Screen (Main Menu): toggle by pressing and holding the Scheduler (clock) Key for five seconds.
Programming of 7-Day Scheduler

7-Day Scheduler
The Seven-Day Scheduler allows the operator to program main power ON and OFF times which coincide with his daily production schedule throughout the work week. Up to ten “events” may be scheduled. A n event is a specific day and time or every day at the same time.

A n ASU which has an active seven-day scheduler should be turned ON at the main power switch. It should not be turned off by the main power switch while the scheduler is active. To turn the ASU OFF (temporarily overriding the scheduler), use the DynaControl On/ Off keypad icon.

In the event of a power outage, or a manually switched main power ON, an active scheduler overrides the “Power On Heater Start” parameter. That is, if the scheduler is in “Switch ON” at the time of a power ON, the heaters will be turned ON. Likewise, if the scheduler is in “Switch OFF” at the time of a power ON, the heaters will be turned OFF.

When the seven-day scheduler is programmed and active, the scheduler icon on the controller screen flashes continuously.

7-Day Scheduler Screen
Use of the 7-Day Scheduler Programming Screen

Press This Function Key To:

<table>
<thead>
<tr>
<th>Action</th>
<th>Day</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scroll Up, Down or Right (F1, 2, 3)</td>
<td>Return (F4)</td>
<td>(Enter)</td>
</tr>
</tbody>
</table>

Select an individual action, day or time
Return to the Main Scheduler Screen
Enter a chosen selection

Programming
1. Press F3 to scroll to the Action column. Then scroll to the first event you desire to program.
2. Press Enter until the desired Action [ie, Standby, Switch On, Switch Off or - - - - - (no event)] is displayed.
3. Scroll (F3) to the Day column.
4. Press Enter until the desired Day (ie, Mon–Fri, Everyday or any individual day) is displayed.
5. Scroll (F3) to the Time column.
6. Press Enter to display the time you desire the event to start. Enter hour, minutes and am/ pm individually.
7. Repeat steps 1 through 6 for each event desired.
8. Press F4 to return to Main Scheduler screen.
Programming of the Optional Memory Card

Note: Programming of the Memory Card Reader should be performed after all other controller programming is complete. This will assure that all of your setpoints are saved to the memory card.

The optional Memory Card Reader gives convenience and security to your production. Temperature setpoints and start signals are electronically stored on the memory card and transferred to the controller when the card is inserted into its slot to the right of the keypad.

Programming
1. Insert the Memory Card in its slot on the control panel. You will then see this screen - -

```
SYSTEM: Ready Tue. 3:36 PM

Load: From Memo. Card to this Controller.
Save: From this Controller to Memo. Card.

LOAD SAVE RETURN
```

2. Choose Load (F1) or Save (F2). After a few seconds you will see this message - -

```
Transmission Done
```

3. Remove your memory card from its slot. You will return to the Actual Temperatures Screen.
Up/Downloading Instructions: Controller to Remote PC (PC Link)

The Upload/Download functions are used to transfer system information and data from or to the DynaControl. To do this, the DynaControl must be connected to an external PC or PLC via a serial cable. The data format is an ASCII text with TAB-delimited data. This text can be created with standard word-processing programs or spreadsheet applications and uploaded or downloaded via terminal programs. Both functions are 'on-demand'-functions, i.e. they must be started on the DynaControl keypad.

Hardware Hookup
Remove the controller mounting bracket from the ASU via four screws accessed from inside the panel box assembly. Using a standard serial extension cable (Male/Female DB9) (if necessary, utilize a DB25 to DB9 adapter), connect either of the DynaControl controller's serial ports (on the Display CPU PCB, see illustration on page 7-5) to the remote computer's COM1 or COM2.

Download Instructions
Download = Transfer data from an external PC to DynaControl

1. DynaControl must be connected to a PC via a Null-Modem-Cable.
2. Start the terminal program on PC.
3. Start PC Link on DynaControl (Function #5 on Service Page 2).
4. If necessary, select Configuration (F3) and change baudrate, than re-enter Function #5.
5. Address setting is not used.
6. Press LOAD (F1).
7. Send ASCII file on terminal program.
8. DynaControl screen should list all received lines.
9. Press RETURN to exit service mode.
10. Customer zone text (command *Text) requires the zone number (temperatures: 1-48, pumps 49-54, pressure 55-66).

Download File Format

The downloaded ASCII text is line-oriented. Pages 29 and 30 show all possible line commands. Each line starts with '*' and the command, following a number of parameters, depending on the command. Each parameter must be separated with a horizontal tab (char #09h). A tab-character must be placed after the last parameter in each line.

Examples:
1. Downloading data for the first filterblock zone


This will set the first filterblock to a setpoint of 325 degrees, tolerance = 30, no offset, zone is switched ON.


This will program the customer pump name for motor #2 (which could be pump #1!) with the string: “Pump 1, Factory Side” cont.
Important Note: the last command in the download file must be *End#

Notes:

The command lines may be arranged in random order.
Maximum file length is 5000 bytes.
Each data field may have a comment text ([tab] Setpoint:325F [tab] = [tab] 325 [tab]).
The DynaControl list screen indicates the commands in abbreviated form.
A ‘?’ after the command on the DynaControl list screen indicates a wrong parameter.
‘ER’ indicates unknown command or syntax error.
If downloading system info using the *System command, the controller does not check for validity of the parameters.

Upload Instructions

The upload function will send an ASCII file to the external PC/PLC. The file contains all zone-related information. The size of the file depends on the number of zones, pumps and pressure transducers.

The data format is similar to the download file.

Example:

......
*PREMEL 1 410 35 -5 ON
......
*PUMP 2 M 850 100 900

Premelt #1: setpoint 410, tolerance 35, offset -5, zone is ON
Pump #2: manual mode with 85.0%, min. speed for automatic 10.0%, max. speed 90.0%

Customer zone names will be indicated with: *TXT-TE for temperature zones
*TXT-PU for Pumps
*TXT-PR for Pressure transducers

1. DynaControl must be connected to a PC via a Null-Modem-Cable.
2. Start terminal program on PC.
3. Start PC Link on DynaControl (Function #5 on Service Page 2).
4. If necessary, select Configuration (F3) and change baudrate, then re-enter Function #5.
5. Address setting is not used.
6. Start “Capture Textfile” at terminal program.
7. Press SAVE (F2).
8. Stop and close file on terminal program.
9. Press RETURN to exit service mode.
### Line Commands (page 1 of 2)

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<td>*Hose</td>
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Temp.: 1-48
Pumps: 49-54
Press.: 55-66

20 characters
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<td>(High=I Low=P)</td>
<td>(High=I Low=P)</td>
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<td>(High=I Low=P)</td>
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Chapter 6
PREVENTIVE MAINTENANCE

Note: Re-read Chapter 1 “Safety Precautions” before performing any maintenance procedures. All maintenance procedures must be performed by qualified, trained technicians.

General Cleaning

The DYNAMELT® M SERIES ASU enclosure is finished with an extremely durable polyurethane paint. The enclosure may be cleaned with a variety of industrial cleaners following manufacturers’ directions. To prevent discoloration or deterioration of the ASU’s finish, avoid prolonged contact with strong solvents.

The molded plastic handles may be cleaned with mineral spirits.

Preventive Maintenance Schedule

The Dynamelt M ASU requires little maintenance. The hopper is fitted with a coarse screen to prevent large debris from entering the system. Normally this screen does not require cleaning. The ASU parts that require regular, periodic maintenance are as follows:

Outlet Filter
The outlet filter should be replaced monthly during the first few months of operation. After you gain experience with your system, you can determine how often you need to replace it. The outlet filter is located on the outlet filter manifold on the hose connection panel of the ASU. See illustration of the outlet filter on page 6-2.

Use the following procedure to replace the outlet filter.

### WARNING HIGH PRESSURE
Turn the motor OFF and trigger the applicators to relieve adhesive pressure before performing any outlet filter maintenance.

### WARNING
Avoid splashing hot adhesive. The filter screen will be covered with hot adhesive and must be handled with proper tools. Position a heat-resistant container under the manifold before proceeding.
1. The system should be at operating temperature before starting this procedure.

2. Before proceeding, verify that the motor(s) is turned OFF and the applicators have been triggered to relieve pressure.

3. Remove the Manifold Access Cover by unscrewing one screw. Then lift up and off.

4. Position a heat-resistant container below the manifold. With a hex key screwdriver (allen wrench), slowly loosen the manifold’s two purge set screws (do not attempt to remove them). Allow adhesive and pressure to escape out of the manifold. Adhesive will drain into the container.

5. Wearing insulated gloves, push down on the adjustment screw cap with sufficient force to release the slide. While holding the cap down, pull the slide forward until the groove stops the roll pin.

Note: If the cap moves “up” before the slide opens fully, this is an indication that there is
still pressure in the system. Stop and verify that the motor/pump is turned OFF and the applicator's valves are open before proceeding. Then repeat step 5.

6. Pull the cap and the filter plug up and out of the filter cavity. Due to adhesive and the o-ring seals, there will be some resistance before the plug exits the cavity. Note: the filter basket hangs from the plug by a spring clip. If the filter pulls free of the spring clip and remains in the cavity, use a hooked tool to extract it.

7. Pull the filter basket free from the spring clip. The filter should be inspected and replaced as needed. Note the char and debris inside the filter basket.

8. Before replacing the filter basket, inspect the two o-rings on the filter plug. Replace any cut or damaged o-ring. Apply hi-temp lubricant (PN 001U002) to a new o-ring before installing.

CAUTION: The condition of the lower o-ring (PN 069X275) is especially critical to maintaining system pressure. A cut or scuffed (scratched) o-ring can allow system pressure to escape.

9. Replace or re-install the filter basket onto the spring clip. Push the filter onto the clip. The clip should straddle the wire bar located inside the hole at the top of the filter.

10. Lower the filter basket and the filter plug back into the filter cavity.

11. Position the two flat surfaces at the top of the filter plug parallel to the movement of the slide. The slide will not return to its operating (locked) position unless these flat surfaces are aligned properly. If necessary, twist the plug to align.

12. Re-tighten the two purge screws.

Hose Fittings
All hose fittings should be checked for tightness after every three months of operation.

Fasteners
After the first ten hours of operation, check all set screws, socket head and cap screws for tightness. Thereafter, re-check all fasteners after every three months of operation.

Filter Shutoff Cleaning or Replacement
See the illustrations in Chapter 10 (Melt & Grid Assembly) for location of the filter shutoff assembly.

1. Pump all the adhesive out of the hopper.

2. Lower the temperature of the application system to the adhesive's softening point.
3. Open the two access doors located at the sides of the ASU. Do not pull out the ground wires attached. The filter shutoff assembly is located on the side of the hopper.

4. Wearing gloves, use a wrench to unscrew the filter shutoff nut and pull the filter shutoff assembly out.

5. a. Replace the clogged filter shutoff assembly, or  
   b. Emersse the assembly in flushing fluid (PN L15653) to loosen contaminants. Remove assembly from fluid and use a hot air gun (if necessary) and rags to clean all contaminants from it.

6. Apply a coat of anti-sieze compound onto the threads of the filter shutoff nut before re-inserting into the ASU.

7. Replace the filter shutoff o-ring. Lubricate the new o-ring with lube (PN N07588).

8. When re-installing the filter assembly, turn the filter’s cut out hole toward the pump. Align the filter shutoff knob in its “open” position. Note: each filter shutoff is stamped “1” (open) and “0” (closed) to show position.

9. Close the access doors. Restore the ASU to normal operation.

**Pump Shaft Leak**

There is a cutout in the baseplate, directly below the pump shaft(s), which will allow adhesive from a leaking pump to exit the ASU. Inspect the area under the baseplate cutout every month for adhesive. A leaking pump shaft indicates a worn pump seal. See instructions in Chapter 8 for replacement of this seal.

**Summary of Preventive Maintenance Schedule**

**Monthly** (or as experience dictates)  
1. Inspect outlet filter basket. Replace as required.  
2. Check for leaking adhesive under the baseplate, caused by a worn pump seal. Replace as required.

**Every Three Months** (or as experience dictates)  
1. Check all hose fittings for tightness.  
2. Check all fasteners for tightness.  
3. Inspect filter shutoff. Clean or replace as required.
Flushing the System

Contaminated adhesive, accumulation of residue in the system and hopper, or changing the adhesive formulation may require the system to be flushed. To flush the system, have at least 6 liters (1.5 gallons) of flushing fluid on hand (PN L15653) per hopper. Repeat this procedure for each hopper of a dual hopper ASU.

1. Pump out as much of the molten adhesive from the hopper as possible.

2. Reduce the ASU’s pump pressure to zero.

Note: the hose used in the following process is merely for the convenience of depositing flushing fluid. This procedure does not have to be repeated for each hose in the system.

3. Disconnect one of the supply hose’s adhesive feed from its applicator head. Do not disconnect the electrical power to the head (since that would disable the pump). Put the hose in a secured position within a container which will catch the used flushing fluid.

4. Add flushing fluid to the hopper and allow approximately fifteen minutes for it to reach hopper temperature. Carefully stir the flushing fluid to mix with any adhesive remaining in the hopper.

5. Slowly increase the pump pressure. Pump about half of the fluid through the hopper, pump and adhesive supply hose into the flushing container.

6. Reduce the pump speed to zero.

7. Remove the outlet filter and replace the basket following the procedures outlined in the “Outlet Filter” section of this chapter.

8. Add new adhesive to the hopper and allow it to reach application temperature.

9. Slowly increase motor speed to the pump.

10. Actuate each of the heads until all the flushing fluid is removed and a steady stream of new adhesive flows.

WARNING

The flushing fluid will splash easily. Wear protective clothing, gloves and a face shield to prevent severe burns.

WARNING

Avoid splashing the flushing fluid from the end of the hose.
11. Re-adjust the pump speed for the desired flow.

12. Re-fill the hopper with adhesive. The system is now ready for production.
Chapter 7
TROUBLESHOOTING

General Troubleshooting Notes

DANGERS

DANGER HIGH VOLTAGE

Dynamelt systems use electrical power that can be life threatening and hot-melt adhesives that can cause serious burns. Re-read Chapter 1 “Safety Precautions” before performing any troubleshooting or repair procedures. All troubleshooting and repair procedures must be performed by qualified, trained technicians.

WARNING HOT SURFACE

CAUTION: Printed circuit boards (PCBs) are prone to damage from static electrical charges during handling. Read “Handling Printed Circuit Boards” in this chapter before handling or attempting service on Dynamelt’s PCBs.

The Dynamelt’s DynaControl includes malfunction self-diagnostics, alerts and error indication alarms. The error indication alarms (the alarms displayed on the DynaControl readout) are triggered whenever there is a sensor failure and whenever there is an over-temperature condition. The operation of the error indication alarms is described in Chapter 4 of this manual.

Preliminary Checks: Verify the following before proceeding:
1. The ASU is switched on.
2. The ASU is supplied with power.
3. The ASU is supplied with pneumatic air.
4. Pneumatic and electrical connections are correct.
5. Adhesive is in the hopper.

Error Messages:
See Ch. 4 for complete instructions on Error Alarms and Messages.
- Sensor Failure on Zone # = temperature zone “#” has an open or shorted sensor.
- Overtemperature on Zone # = temperature zone “#” has exceeded setpoint limitation.
- Communication Error = indicates a serious problem which requires service by Dynatec.
- Hopper Overtemp = hopper temperatures have exceeded their thermostat’s setting.

Hose/Applicator Troubleshooting Tip
Hose or applicator problems can be isolated by electrically connecting the applicator and hose to an alternate socket on the ASU. If the malfunction goes with the applicator and hose, the problem will usually be in the applicator or hose that was moved. If the malfunction does not move with the applicator and hose, the problem is probably in the ASU.

Motor Speed Control PC Board Re-set
Anytime the AC drives’s Motor Speed Control printed circuit board must be re-set due to line surges or over-currenting the motor, turn the ASU OFF by the main power switch and wait at least 20 seconds before attempting to re-start. This will allow the pcb to re-set. See the table on page 7-7 to troubleshoot.
High-Temperature Redundant Overtemp Thermostat
The ASU includes a mechanical (redundant) overtemp thermostat that acts as a safety backup. If the ASU’s hopper temperature should exceed $232^{\circ}C$ ($450^{\circ}F$), the thermostat will cause the ASU’s circuit breaker to open and power to the hopper and all hoses and heads will be cut off. The mechanical thermostat must be manually re-set after the hopper temperature falls below $204^{\circ}C$ ($400^{\circ}F$).

The overtemp thermostat is located behind the motor access door (see Chapter 8). To reset: turn OFF the ASU’s main power switch, push the center of the thermostat’s insulator to re-set, restart the ASU.

Pump Enable Thermostat
The pump enable thermostat is a low-temperature safety feature of the Dynamelt ASU designed to prevent the pump from powering on before the adhesive is molten. It is a cartridge thermostat and it is factory set at $135^{\circ}C$ ($275^{\circ}F$). The thermostat is adjustable so that operators using adhesives with extraordinarily high or low melting points can tailor the low-temp setting to their production’s needs.

To access the pump enable thermostat, follow the instructions given in Chapter 8. Refer to Chapter 3 for instructions on calibration of this thermostat.

Lithium Battery on CPU PCB
The CPU Printed Circuit Board contains a lithium battery which serves no function in the Dynamelt M Series controller configuration.

Lithium Battery on Display CPU PCB
The Display CPU Board contains a lithium battery. The normal life of this battery is about ten years. When the battery needs replacement, the scheduler’s clock does not function, but other controller features remain intact. Return the board to ITW Dynatec for battery replacement.
Handling Printed Circuit Boards (PCBs)
The Dynamelt ASU and DynaControl controller utilize several printed circuit boards (PCBs). These boards are extremely sensitive to electrostatic charges. When working near or with any PCBs, the following procedures must be followed to avoid damage to them.

DANGER HIGH VOLTAGE
Before unplugging connectors from the I/O PCBs, ground yourself to the ASU by touching any available unpainted cool metal surface, mounting screws, etc. This will avoid electrical discharge to the PCB assembly when you are removing and replacing connectors.

CAUTION: Printed circuit boards (PCBs) should be handled using the following procedures:

1. Wear a wrist grounding strap. If a grounding strap is not available, frequently touch a bare metal part of the ASU (unpainted frame, mounting screw, etc.) to safely discharge any electrostatic buildup on your body.

2. Handle a PCB by its edges only. Don't grip a PCB across its surface.

3. When removed from the ASU, each PCB must be individually packaged inside a metallized, static drain envelope. Do not place the removed PCB on a table, counter, etc. until it has first been placed in or on a static drain envelope.

4. When handing a PCB to another person, touch the hand or wrist of that person to eliminate any electrostatic charge before you hand the PCB to him.

5. When unwrapping a PCB from its static drain envelope, place the envelope on a grounded, nonmetallic surface.

6. To cushion PCBs for shipment, use only static-drain bubble pack. Do not use foam peanuts or bubble pack not known to be static draining.

The following pages detail the Dynamelt M Series PCBs.
**CPU Printed Circuit Board**

The CPU board(s) contains the controller’s software chip (EPROM), CPU chip and non-volatile memory. It also contains the optional RTD Expansion PCB (for ASUs with 10 or more zones). Up to three CPU boards may be installed on an ASU, corresponding to up to three hoppers and up to 48 temperature zones (16 per CPU pcb).

The Low Level relay is fixed at normally open. The High/Low Alarm relay is fixed at normally closed. During normal operation, the two red indicator lights are always ON.

---

**Diagram of CPU Board Components**

- **CPU chip**
- **Software chip EPROM**
- **Relay outputs:**
  - 1&2 = alarm contacts
  - 3&4 = low level contacts
- **Terminal connections:**
  - 1 = Program Select 1 (1/2) Input
  - 2, 4, 6, 8 = +12V
  - 3 = Low Level Detect Input
  - 5 = External Setback Input
  - 7 = Program Select 2 (3/4) Input
  - 9 &10 = Ground
- **Sensor Inputs for Zones 1 to 5**
- **Sensor Inputs for Zones 6 to 9**
- **Sensor Inputs for Zones 10 to 15**
- **Sensor Inputs for Zone 16**
- **Optional RTD Expansion PCB (for ASUs with over 9 zones)**
- **Dip switches: not used**
- **Lithium battery (not used in M Series configuration)**
- **LED1 monitors DC voltage: regulated +5 volts**
- **LED2 monitors DC voltage: +12 volts**

---

*Layout of Components on CPU Board*
Display CPU Printed Circuit Board

The Display CPU PCB contains the controller’s CPU module, scheduler battery, serial ports and optional connections. It is located directly behind the controller’s display panel within its mounting bracket (or within the remote pendant assembly (option), if applicable).

When downloading software updates, use the download serial port seen at the lower right of the illustration. While downloading, the J1 jumper is moved temporarily to its #1 position.

To configure the number of (optional) pressure transducers on an ASU, use the dip switches (shown below beneath the expansion board) and the following chart. There are four transducers per PSI PCB and a maximum of three PSI PCBs per ASU. Note: PSI not available on APS models.

On the RS-Com board, both the J1 and J2 jumpers must be in upper position for 485 and both in lower position for 232.

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<th>3</th>
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<td>3</td>
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<td>OFF = normal</td>
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Optional Memory Card Reader

Optional Expansion Board (for Serial Communication)

CAUTION! FOR EXPANSION BOARD CONNECT ONLY

Optional RS232 Serial Connect (use for PLC/ PC Link)

Optional RS485 Serial Connect (use for PLC/ PC Link)

Download Jumper

Connect to opt. Expansion Board

Scheduler Battery

Reset

Download Reset

J1 SW1 SW2

Connect to opt. Expansion Board

Optional Memory Card Reader connect

Connect to CPU PCB

Software Download Port

Layout of Components on Display CPU PCB
Motor Control Interface Printed Circuit Board

For each motor on the ASU, there is a Motor Control Interface PCB and a Motor Speed Control PCB. The Motor Control Interface PCB (diagrammed below) connects directly to the CPU PCB. The Motor Speed Control PCB (diagrammed on the following page) connects via a spade connector to the Motor Control Interface PCB. Up to two motor’s pcbs may be connected to one CPU PCB.

Each Motor Control Interface PCB’s jumpers should be set as follows: the J1 and J2 jumpers should always be set in the M1 position diagrammed below for motor #1, #3 and #5. For motor #2, #4 and #6, jumpers J1 and J2 are set in the M2 position (opposite from those diagrammed below). The M/S selection jumper must be set in the “M” position. The J3 jumper is always set as shown below.

“MAX” speed adjusting pot: This pot adjusts the maximum output voltage of the motor speed control board. It is factory preset to full pump motor rpm (100%). Normally, this pot does not need adjustment. Turning clockwise increases the voltage. To verify adjustment, set the motor to “manual” mode and to 100% speed. Then adjust the pot to desired maximum speed (±5%).

NOTE: Do not attempt to use the MAX pot adjustment to trim the line speed to a given value. Proper automatic line speed following is accomplished with correct motor programming into the controller (see Chapter 5).

“ENCODER” connections: the optional Digital RPM Readout’s encoder is installed onto these board connections.

Layout of Components on Motor Control Interface Board
**Motor Speed Control Printed Circuit Board**

The Motor Speed Control PCB is connected to the Motor Control Interface Board via spade connectors P1 and P2. P3 is not used.

The three jumpers (FSR, J1 and A/M) are factory set, do not change. The J1 jumper is always set in the upper position. The A/M jumper is always present.

“CL” adjusting pot: The current limit (CL) adjustment will limit the maximum current available to the AC pump motor during overload. This will protect the motor from damage. The setting is factory set to deliver 100% of the rated horsepower for the ASU. When the motor load exceeds the current limit value, the Status LED (light) will illuminate red (indicating an overload condition). Turning clockwise increases the current limit value; turning counter-clockwise decreases it. The current limit is factory preset, so no adjustment is necessary.

“A CC” and “DEC/B” adjusting pots: These pots change the time required for the pump motor to accelerate (ACC) or de-accelerate. Turning full counter-clockwise equals 0.3 seconds. Turning full clockwise equals 20.0 seconds. Factory default for either pot is 10.0 seconds.

---

**ST LED Color** | **State** | **Function** | **ST LED Color** | **State** | **Function**
--- | --- | --- | --- | --- | ---
Green | Slow Flash | Normal Operation | Red/Yellow | Quick Flash | Undervoltage
Red | ON | Current Limit | Red/Yellow | Slow Flash | Overvoltage
Red | Quick Flash | Overload | Yellow | ON | Stop
Red | Slow Flash | Short Circuit

**Layout of Components on Motor Drive Board**
“MIN” adjusting pot: This pot adjusts the minimum speed of the pump motor when it is enabled. The pot is factory preset to exactly zero RPM when the speed setting is 0.00% full scale. Turning clockwise increases the minimum RPM above zero RPM when the motor is enabled. This adjustment can be utilized to “creep” the motor (also referred to as “auto preload”) so that positive adhesive pressure is always maintained in the system.
48-Zone Power Printed Circuit Board

The 48-Zone Power PCB has the capacity to monitor adhesive temperatures for multiple hoses, applicators, hoppers and auxiliary zones.

The LEDs for each temperature zone (1 through 48 illustrated below) will flash on and off as their heaters output to maintain setpoint temperature. The Power On and Hopper LEDs will light continuously once the hopper(s) are up to temperature.

The settings of the JP1 and JP2 jumpers correspond to the number of hoppers on the ASU. For an ASU with one hopper, both jumpers must be set to position 1-2 (shown). For two hoppers, JP1 must be set at 1-2 and JP2 must be set at 2-3.
Optional Clutch Printed Circuit Board

The Clutch PCB allows installation of up to six (optional) clutches on the ASU. The dip switches (SW1) are turned ON to reflect the number of clutches on the system.

Layout of Components on Clutch Board

Optional RS232/485 Printed Circuit Board

Pin Configuration:

<table>
<thead>
<tr>
<th>Pin</th>
<th>RS232</th>
<th>RS485</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 RxD</td>
<td>8 RxB</td>
</tr>
<tr>
<td>2</td>
<td>3 TxD</td>
<td>4 TxA</td>
</tr>
<tr>
<td>3</td>
<td>5 Gnd</td>
<td>6 Gnd</td>
</tr>
<tr>
<td>4</td>
<td>9 Shield</td>
<td>9 Shield</td>
</tr>
</tbody>
</table>

Layout of Components on Communication Board
**Optional Pressure (PSI) Printed Circuit Board**

Each Pressure (PSI) PCB on the ASU allows the controller to monitor up to four pressure transducers. The DM 35 ASU can accept one PSI PCB (four transducers), the DM 70/140 ASUs can accept up to two PSI PCBs (up to eight transducers) and the DM 210 ASU can accept up to three PSI PCBs (up to 12 transducers). Each CPU board can accommodate one PSI PCB.

The 8 pairs of terminals at the top edge of the board (as seen below) are for the high and low alarm outputs of the relays. The eight jumpers for the high/low alarm output relays (E1 thru E8) are factory set to Normally Open (default) and are illustrated below in default position.

The leads from the pressure transducers are connected at the left of the board (as seen below).

Note: the quantity of pressure transducers on an ASU is configured at the dip switches on the Display CPU PCB.
Heater and Sensor Resistance Values

The resistance values given in the four tables on the following page will aid in troubleshooting when a sensor or heater malfunction is suspected. The “Temperature Sensor Resistance” table gives values for various temperatures. If you know the approximate temperature of the suspected sensor, you can check to see if the sensor resistance approximates the value given in the table by unplugging the affected head or hose connection and measuring resistance across the affected pins (see wiring diagram in Chapter 11 for pin numbers).

The “Nominal Hose Heater Resistance” table gives the heater resistance for hoses. A suspected hose heater problem can be quickly isolated by measuring hose heater resistance and comparing it to the correct resistance for your hose length and voltage as shown.

The “Nominal Head Heater Resistance” table gives values for several different head wattages. A suspected head heater problem can be isolated by measuring head heater resistance and comparing it to the resistance for the appropriate wattage of your system.

The “Nominal Hopper Heater Resistance” table gives heater resistance for the hopper heaters of each Dynamelt M Series model and for the (optional) drop-in grids.

The “Nominal Filter Manifold Heater Resistance” table gives heater resistance for the heater located in the (optional) filter manifold/pressure relief block. The heater inside the manifold varies depending on the number of filter manifolds mounted on the ASU, therefore resistance varies also.

DANGER HIGH VOLTAGE

Disconnect input power to the application system before disconnecting/re-connecting electrical connections. Make sure there is no electrical power on the leads you will be connecting.
# Troubleshooting

## Model: M35 M70/140 M210

<table>
<thead>
<tr>
<th>Qty. Hopper Heaters</th>
<th>M35</th>
<th>M70/140</th>
<th>M210</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. # of Drop-in Grids</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Resistance (Ohms) for each Hopper Heater</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>Resistance (Ohms) for each Drop-in Grid Heater</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
</tbody>
</table>

## Nominal Hopper Heater Resistance in Ohms

<table>
<thead>
<tr>
<th># of Filter Manifolds on ASU</th>
<th>Model: M35</th>
<th>M70/140</th>
<th>M210</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>115.2</td>
<td>115.2</td>
<td>115.2</td>
</tr>
<tr>
<td>2</td>
<td>51.6</td>
<td>51.6</td>
<td>51.6</td>
</tr>
<tr>
<td>3</td>
<td>not available</td>
<td>38.4</td>
<td>38.4</td>
</tr>
<tr>
<td>4</td>
<td>not available</td>
<td>28.8</td>
<td>28.8</td>
</tr>
<tr>
<td>5</td>
<td>not available</td>
<td>not available</td>
<td>TBD</td>
</tr>
<tr>
<td>6</td>
<td>not available</td>
<td>not available</td>
<td>186</td>
</tr>
</tbody>
</table>

## Temperature Sensor Resistance

(0.00385 PT 100 RTD)

<table>
<thead>
<tr>
<th>Temperature °F</th>
<th>Temperature °C</th>
<th>Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
<td>104</td>
</tr>
<tr>
<td>68</td>
<td>20</td>
<td>108</td>
</tr>
<tr>
<td>86</td>
<td>30</td>
<td>112</td>
</tr>
<tr>
<td>104</td>
<td>40</td>
<td>116</td>
</tr>
<tr>
<td>122</td>
<td>50</td>
<td>119</td>
</tr>
<tr>
<td>140</td>
<td>60</td>
<td>123</td>
</tr>
<tr>
<td>158</td>
<td>70</td>
<td>127</td>
</tr>
<tr>
<td>176</td>
<td>80</td>
<td>131</td>
</tr>
<tr>
<td>194</td>
<td>90</td>
<td>135</td>
</tr>
<tr>
<td>212</td>
<td>100</td>
<td>139</td>
</tr>
<tr>
<td>230</td>
<td>110</td>
<td>142</td>
</tr>
<tr>
<td>248</td>
<td>120</td>
<td>146</td>
</tr>
<tr>
<td>268</td>
<td>130</td>
<td>150</td>
</tr>
<tr>
<td>284</td>
<td>140</td>
<td>154</td>
</tr>
<tr>
<td>302</td>
<td>150</td>
<td>157</td>
</tr>
<tr>
<td>320</td>
<td>160</td>
<td>161</td>
</tr>
<tr>
<td>338</td>
<td>170</td>
<td>164</td>
</tr>
<tr>
<td>356</td>
<td>180</td>
<td>168</td>
</tr>
<tr>
<td>374</td>
<td>190</td>
<td>172</td>
</tr>
<tr>
<td>392</td>
<td>200</td>
<td>176</td>
</tr>
<tr>
<td>410</td>
<td>210</td>
<td>180</td>
</tr>
<tr>
<td>428</td>
<td>220</td>
<td>183</td>
</tr>
</tbody>
</table>

## Hose Length Resistance

<table>
<thead>
<tr>
<th>Meters</th>
<th>Feet</th>
<th>Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td>4</td>
<td>323-358</td>
</tr>
<tr>
<td>1.8</td>
<td>6</td>
<td>201-223</td>
</tr>
<tr>
<td>2.4</td>
<td>8</td>
<td>155-172</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>120-133</td>
</tr>
<tr>
<td>3.7</td>
<td>12</td>
<td>102-114</td>
</tr>
<tr>
<td>4.9</td>
<td>16</td>
<td>75-84</td>
</tr>
<tr>
<td>7.3</td>
<td>24</td>
<td>51-57</td>
</tr>
</tbody>
</table>

## Nominal Hose Heater Resistance for DynaFlex Hoses

<table>
<thead>
<tr>
<th>Watts</th>
<th>Resistance in Ohms</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>288</td>
</tr>
<tr>
<td>270</td>
<td>213</td>
</tr>
<tr>
<td>350</td>
<td>165</td>
</tr>
<tr>
<td>500</td>
<td>115</td>
</tr>
<tr>
<td>700</td>
<td>82</td>
</tr>
</tbody>
</table>

## Nominal Head Heater Resistance

Note: Resistance is measured at ambient temperature (20°C / 68°F).
Error Indication Alarm Troubleshooting Guide

The operation of error indication alarms is described in Chapter 4. When checking for correct equipment operation in the following guide, be aware that all heaters will go off immediately after an error indication alarm occurs if the operator takes no action. With the exception of the fuses, there are no user-replaceable parts on the printed circuit boards. If there is a non-fuse failure on any of the PCBs, the PCB must be replaced.

**DANGER HIGH VOLTAGE**

Some of the procedures in the following Troubleshooting Guide require potentially dangerous electricity to be present. Only qualified service personnel should perform these procedures.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hopper (tank)</td>
<td>1. Setpoints have been programmed without enough deviation.</td>
<td>1. Re-program setpoints, allowing a larger deviation between the high and low limits.</td>
</tr>
<tr>
<td>Overtemp</td>
<td>2. Hopper sensor inoperative.</td>
<td>2. Replace hopper sensor if resistance does not comply with the resistance table in this chapter.</td>
</tr>
<tr>
<td></td>
<td>3. Hopper control solid state relay inoperative.</td>
<td>3. a. Verify that the relay is not shorted by removing all of its output wires and verifying that resistance is greater than zero.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Verify condition of relay by disconnecting, then re-connecting properly. Then, when Temperature Zone is OFF, use a VOM AC voltmeter to verify that 240 volts are not present at the heater terminal.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hopper Sensor Open</td>
<td>1. Sensor cable has become unplugged from CPU PCB</td>
<td>1. Verify that hopper sensor cable is properly connected on X14 on the CPU PCB.</td>
</tr>
<tr>
<td></td>
<td>2. Inoperative hopper sensor.</td>
<td>2. Replace hopper sensor if resistance does not comply with resistance table in this chapter.</td>
</tr>
<tr>
<td>Hopper Sensor Short</td>
<td>1. Short-circuit caused by debris where sensor plugs into CPU PCB.</td>
<td>1. Verify that sensor plug is clean and correctly connected on X14 on the CPU PCB.</td>
</tr>
<tr>
<td></td>
<td>2. Pinched sensor lead wire.</td>
<td>2. Visually inspect sensor lead wire for break, kink, damage, etc. If no obvious damage, use an ohmmeter to measure continuity from the sensor lead to the plug at the CPU PCB. Repair or replace any damaged wire.</td>
</tr>
<tr>
<td></td>
<td>3. Inoperative hopper sensor.</td>
<td>3. Replace hopper sensor if resistance does not comply with resistance table in this chapter.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hopper Heater Open</td>
<td>1. Disconnection in hopper heater circuit.</td>
<td>1. Inspect hopper heater wiring for proper connections.</td>
</tr>
<tr>
<td></td>
<td>2. Disconnection between Power PCB and CPU PCB.</td>
<td>2. Verify that all connections are properly made on the CPU PCB.</td>
</tr>
<tr>
<td></td>
<td>3. Hopper circuit breaker tripped.</td>
<td>3. Refer to the schematic in Chapter 11 to locate the hopper circuit breaker. If it is tripped, do not re-set it without checking for causes. Visually and electrically inspect for a short-circuit to ground in the hopper heater circuit. This will be limited to between the hopper control relay and the hopper heater.</td>
</tr>
<tr>
<td></td>
<td>4. Open hopper heater element.</td>
<td>4. At the terminal rail: use an ohmmeter to measure resistance across H3A and N (380v) or across H3A and H3B (240v). See the resistance table in this chapter for normal resistance values. Infinitely high resistance values indicate an open heating element which must be replaced.</td>
</tr>
<tr>
<td>(Optional) Drop-in Grid Overtemp</td>
<td>NOTE A: DM 70/140 models may have up to two hopper heaters.</td>
<td>If the ASU has a second heater, measure this heater’s resistance across H15A and N (380v) or across H15A and H15B (240v) as outlined above.</td>
</tr>
<tr>
<td></td>
<td>NOTE B: DM 210 models may have up to three hopper heaters.</td>
<td>If the ASU has a second heater, see Note A. If the ASU has a third heater, measure this heater’s resistance across H27A and N (380v) or across H27A and H27B (240v) as outlined above.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Optional) Drop-in Grid Overtemp</td>
<td>1. Setpoints have been programmed without enough deviation.</td>
<td>1. Re-program setpoints, allowing a larger deviation between the high and low limits.</td>
</tr>
<tr>
<td></td>
<td>2. Grid sensor inoperative.</td>
<td>2. Examine grid sensor assembly for intermittent break in sensor lead. Remove sensor bulb from grid. Replace grid sensor if resistance does not comply with the resistance table in this chapter.</td>
</tr>
</tbody>
</table>
### Problem | Possible Cause | Solution
--- | --- | ---
(Optional) Drop-In Grid Sensor Open | 1. Sensor cable has become unplugged from CPU PCB.  
2. Disconnection between Power PCB and the CPU PCB.  
3. Drop-in grid sensor inoperative. | 1. Verify that grid sensor cable is properly connected at X14 on the CPU PCB.  
2. Verify that all connections are properly made on the CPU PCB.  
3. Replace sensor if resistance does not comply with the resistance table in this chapter.

(Optional) Drop-in Grid Sensor Short | 1. Short-circuit caused by debris where sensor plugs into CPU PCB.  
2. Pinched sensor lead wire.  
3. Drop-in grid sensor inoperative. | 1. Verify that sensor plug is clean and correctly connected at X14 on the CPU PCB.  
2. Visually inspect sensor lead wire for break, kink, damage, etc. If no obvious damage, use an ohmmeter to measure continuity from the sensor lead to the plug at X14 on the Power PCB. Repair or replace any damaged wire.  
3. Replace sensor if resistance does not comply with the resistance table in this chapter.
### Problem: Optional) Drop-in Grid Heater Open

<table>
<thead>
<tr>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Disconnection in grid’s heater circuit.</td>
<td>1. Inspect grid’s heater wiring for proper connections.</td>
</tr>
<tr>
<td>2. Disconnection between Power PCB and solid state relay.</td>
<td>2. Verify that the Power PCB is properly connected to the solid state relay.</td>
</tr>
<tr>
<td>3. Drop-in grid circuit breaker tripped.</td>
<td>3. Refer to the schematic in Chapter 11 to locate the grid’s circuit breaker. If it is tripped, do not re-set it without checking for causes. Visually and electrically inspect for a short-circuit to ground in the grid’s heater circuit. This will be limited to between the grid’s control relay and the grid’s heater.</td>
</tr>
</tbody>
</table>
| 4. Open drop-in grid heater element. | 4. At the terminal rail, use an ohmmeter to measure resistance as follows:  
   - For 1 grid: H1A & N (380v)  
     H1A & H1B (240v)  
   - For 2nd grid: H2A & N (380v)  
     H2A & H2B (240v)  
   - For 3rd grid: H13A & N (380v)  
     H13A & H13B (240v)  
   - For 4th grid: H14A & N (380v)  
     H14A & H14B (240v)  
   - For 5th grid: H25A & N (380v)  
     H25A & H25B (240v)  
   - For 6th grid: H26A & N (380v)  
   See the resistance table in this chapter for normal resistance values. Infinitely high resistance values indicate an open heating element which must be replaced. |

**NOTE:** The DM 35 ASU may have 1 or 2 grids. The DM 70/140 ASU may have from 1 to 4 grids. The DM 210 ASU may have from 1 to 6 grids.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose/ Head (No.) Overtemp</td>
<td>1. Hose/ Head setpoints incorrectly programmed.</td>
<td>1. Re-program setpoints to allow a larger deviation.</td>
</tr>
<tr>
<td></td>
<td>2. Inoperative or shorted hose/ head triac or dual solid state relay.</td>
<td>2. Refer to the schematic in Chapter 11 to locate the correct head/ hose triac or relay. Use a clamp-on ammeter to monitor hose/ head current. If current does not cycle on and off, then the triac or relay has failed and must be replaced.</td>
</tr>
<tr>
<td></td>
<td>3. Disconnection between the Power PCB’s and the CPU board’s flat cables.</td>
<td>3. Verify that all PCB’s are properly mounted inside the panel box.</td>
</tr>
<tr>
<td></td>
<td>4. Hose/ Head sensor circuit inoperative.</td>
<td>4. a. Visually examine socket connection where hose/ head attaches to ASU. Verify that pins are properly seated. If pins or plug housing are damaged, repair or replace hose. If socket is damaged, repair or replace harness.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. If hose-to-ASU plug and socket are okay, hose may have intermittent short or open circuit. Repair or replace hose, hose harness or Power PCB as appropriate. Alternately, problem can be isolated by connecting the effected hose to a different ASU hose socket to tell whether the problem is in the hose or in the Power PCB.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. If head-to-hose and hose-to-ASU plugs and sockets are okay, head sensor may have an intermittent short or open circuit. Examine connections inside the service block area of the head and monitor head sensor resistance with an ohmmeter while flexing sensor leads. Repair or replace as appropriate.</td>
</tr>
</tbody>
</table>

![Diagram](image)

Note: Vertical configuration is for DM 35 only. Larger ASUs are arranged horizontally.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose/ Head (No.) Sensor Short</td>
<td>1. Debris at connection between hose/ head and ASU.</td>
<td>1. Visually inspect hose plug and ASU socket for cleanliness and proper contact and seating of pins.</td>
</tr>
<tr>
<td></td>
<td>2. Hose/ Head sensor circuit inoperative.</td>
<td>2. Using the hose schematic, check hose sensor resistance at ASU socket. A nonohmmeter can be used to isolate a pinched wire in the hose harness. When cause is isolated, replace hose, hose harness or Power PCB as appropriate.</td>
</tr>
<tr>
<td></td>
<td>2. Hose sensor harness unplugged from Power PCB.</td>
<td>3. Verify that all PCBs are properly mounted inside the panel box.</td>
</tr>
<tr>
<td></td>
<td>3. Disconnection between the Power PCB’s and the CPU PCB’s flat cables.</td>
<td>4. Replace head sensor if resistance does not comply with resistance table in this chapter. Use hose schematic to check hose sensor at ASU socket. Repair or replace hose, hose harness or Power PCB as appropriate.</td>
</tr>
<tr>
<td></td>
<td>4. Hose/ Head sensor circuit inoperative.</td>
<td></td>
</tr>
</tbody>
</table>

Note: Vertical configuration is for DM 35 only. Larger ASUs are arranged horizontally.
<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hose/ Head (No.) Heater Open</td>
<td>1. Disconnection between hose/ head and ASU.</td>
<td>1. Visually examine effected hose plug and ASU socket for cleanliness and proper contact and seating. Refer to the wiring diagram for pin identification. The problem can be isolated by plugging the effected hose/ head into another ASU socket. If the new hose number is then displayed as malfunctioning, the problem is in the hose that was moved. Repair or replace hose, head or ASU hose harness as appropriate.</td>
</tr>
<tr>
<td></td>
<td>2. Disconnection between solid state relay and Power PCB or inoperative relay.</td>
<td>2. Check connection. Verify that solid state relay is operative: check schematic in Chapter 11 for relay location. Use a clamp-on ammeter to monitor hose/ Head current. If current does not cycle on and off, the relay has failed and must be replaced.</td>
</tr>
<tr>
<td></td>
<td>3. Disconnection between cartridge heater and cable assembly inside head.</td>
<td>3. Visually inspect wiring inside head. Verify that cartridge heater leads are properly connected in the service block area.</td>
</tr>
<tr>
<td></td>
<td>4. Inoperative hose/ head circuit breaker.</td>
<td>4. Refer to schematic in Chapter 11 for location of circuit breaker. If it is found to be tripped, do not re-set it without first finding cause. Visually inspect and use an ohmmeter to check for a possible short circuit to ground in the hose/ head heater circuit.</td>
</tr>
<tr>
<td></td>
<td>5. Open hose/ head heater element.</td>
<td>5. Use an ohmmeter to measure hose/ head heater resistance. See resistance table in this chapter for resistance values. Infinitely high resistance indicates an open heater element.</td>
</tr>
<tr>
<td></td>
<td>6. Open wiring inside ASU.</td>
<td>6. Visually inspect ASU wiring and use an ohmmeter and the wiring diagram to locate open wires in head heater circuit. Repair or replace ASU hose head harness or other ASU wiring as necessary.</td>
</tr>
</tbody>
</table>
Adjustable Adhesive Pressure Relief Valve

Dynamelt pumps are outfitted with a high-pressure relief valve located on the outlet filter manifold. The valve is adjustable and it does not affect adhesive pressure under normal operating conditions. The adjustable pressure relief valve is factory set at 34 bar (500 psi) for Dynamelt M gear pumps.

When adhesive pressure exceeds the set limit, the pressure forces the valve to move away from its seat, compressing the spring and allowing adhesive to flow back to the hopper. This adhesive flow reduces pressure. When the pressure falls below the set limit, the spring forces the valve against its seat, cutting off adhesive flow. The check valve, seen below, is not instrumental in pressure relief. It serves as an overflow valve, preventing adhesive from flowing out of the hopper when the filter plug is removed.

**Normally Closed (Unrelieved):**
In the drawing below, the pressure relief valve is closed.

**Open (Relieved):**
In this drawing, pressure has exceeded the setting of the valve, causing it to open and discharge adhesive to the hopper.

---

**Operation of the Adjustable Adhesive Pressure Relief Valve**

Diagram showing the operation of the valve, with arrows indicating the flow of adhesive from pump to hose, return to hopper, and through the filter block.
Operation of the ASU’s Gear Pump

Manual or Automatic Pump Operation
Choose “Manual”, “Stop” or “Automatic” gear pump operation via the “Motor” pushbutton (see icon above) on the controller’s keypad. When the Dynamelt’s pump is to be operated manually (that is, without a line following signal), the manual mode is used to control pump speed (and adhesive output). For the gear pump to be operated in the automatic mode, a tach generator, or equivalent (attached to the parent conveyor line) must be provided and the following set-up procedure should be performed:

1. The tach generator or the signal isolator must be adjusted so that the voltage from the speed controller is 0 to 10 VDC (but not more than +10 VDC when the conveyor is at maximum speed). This voltage is measured at either X3 on the Motor Control Interface PCB (for a tach generator) or at terminals 9 (+) and 10 (-) of the Signal Isolator Board.

2. The “Automatic” setting then changes pump speed for any given 0 to +10 VDC incoming tachometer signal. Voltage will vary given production speed.

The motor speed can be adjusted (trimmed) in automatic mode by setting maximum and minimum percent of full speed values on the controller’s keypad. MAX % of Full Speed will be the true motor speed at 10 volts input. This value cannot exceed 100%.

To make the motor speed adjustment, follow the programming instructions in Chapter 5.

Pump Output Adjustment
When the adhesive in the ASU’s hopper has reached a temperature high enough for the pump to operate safely, the controller will place the hopper in “Ready” condition and power will be supplied to the pump. The pump is self-priming.

Pump output is adjusted by the motor speed control on the controller’s keypad. However, if less pressure is needed, maximum pressure of the pump can be decreased (or increased) by adjusting the pressure relief valve installed on the pump output manifold. To change the setting of this valve, refer to instructions in Chapter 3.

The relief valve is factory set at 34 bar (500 psi) for Dynamelt M gear pumps.
Troubleshooting the ASU's Gear Pump

No special tools are needed for working on the ASU pump. See Chapter 8 of this manual for disassembly/assembly procedures for the ASU pump, and Chapter 10 for locating pump parts on the component illustrations (exploded-view drawings).

**Gear Pump Priming/ Start-Up**

The pump is self priming.

⚠️ **CAUTION:** DO NOT continue to run the pump if no glue is coming out. This could damage the pump since it uses the glue as a lubricant. Stop and troubleshoot.
### Gear Pump Troubleshooting Guide

**WARNING HOT SURFACE & ADHESIVE**

Some of the procedures in the following Troubleshooting Guide require working near hot adhesive. Be sure to wear protective gloves, safety glasses and clothing and use proper tools for handling hot melt components.

Note: Each motor and Motor Interface PCB in the system can run independently (or dependently). Each Motor Interface PCB may have its own operating parameters. Therefore, each motor and Motor Interface PCB should be troubleshooting independently.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
</table>
| Pump doesn’t operate in “Manual” mode, power light doesn’t light. | 1. Motor On/Off is OFF at the controller keypad.  
3. No incoming electrical power. | 1. Check keypad setting.  
3. Check to see if ASU temperature control is operating. If not, check for presence of incoming supply voltage. |
| Pump doesn’t operate in “Manual” mode, power light is ON, hopper is at “ready” condition. | 1. “Manual” motor is set at zero (at the keypad).  
2. If pump On/Off is being controlled by a remote switch (i.e., a hand-held, applicator), the switch or switch circuit may be open.  
3. Low temp alarm.  
2. Check condition of the remote switch (the hand-held applicator).  
3. Verify that ASU is warmed up and that hopper temperature is above the factory-set pump enable temperature.  
4. If the board is faulty it must be replaced. |
<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump doesn’t operate in “Auto” mode, power light is ON, hopper is at ready condition.</td>
<td>1. Parent machine is not running. 2. “Auto” motor is set at zero (at controller keypad). 3. No incoming line following signal. 4. Internal ASU connections or Motor Control Interface PCB inoperative. 5. System is not ready, temperatures are too low.</td>
<td>1. Check parent machine. 2. Re-program motor. 3. Check for presence of 0 to 10 VDC control signal at X3 of Motor Control Interface PCB. If signal is not present, check connection at X3 and tachometer drive connections. If control signal is present there, the problem is within the ASU. 4. Check for the presence of 0 to 10 VDC control signal at X3 of Motor Control Interface PCB. Check ASU connections (S1 &amp; S2). If the signal is not present, the problem is in the connection. If the signal is present there, the problem is most likely a faulty Motor Control Interface Board. 5. Verify that ASU is warmed up and that hopper temperature is above the low temperature thermostat.</td>
</tr>
<tr>
<td>Pump runs but there is no adhesive output.</td>
<td>1. ASU is out of adhesive. 2. If pump has been serviced and leads reversed, pump will run with no output.</td>
<td>1. Add adhesive to hopper. 2. Check pump wiring to schematic.</td>
</tr>
<tr>
<td>Low or inconsistent adhesive output.</td>
<td>1. Filter(s) clogged. 2. Adhesive used is too viscous. 3. Clogged hose. 4. Clogged applicators.</td>
<td>1. Remove and inspect filter basket and primary filter. 2. Verify that system components are at appropriate temperatures and that the selected adhesive is correct for the application. 3. Inspect hose for kinks or internal plugs of debris or char. Clean or replace hoses as necessary. 4. Inspect applicators for plugged nozzles or filters. Clean or repair applicators as necessary.</td>
</tr>
<tr>
<td>Problem</td>
<td>Possible Cause</td>
<td>Solution</td>
</tr>
<tr>
<td>---------</td>
<td>---------------</td>
<td>----------</td>
</tr>
<tr>
<td>5. The fixed pressure relief valve is opening.</td>
<td>5. When fully closed (clockwise) and all applicators are off, adhesive pressure should be around 34 bar (500 psi). If it is significantly less, the pressure relief valve should be replaced.</td>
<td></td>
</tr>
<tr>
<td>6. Inoperative lower o-ring in filter plug is allowing pressure to escape.</td>
<td>6. Replace o-ring. Follow diagram and instructions in Chapter 6 for “Outlet Filter” to locate the o-ring.</td>
<td></td>
</tr>
<tr>
<td>Adhesive leak at pump shaft seal.</td>
<td>1. Pump seal is incorrectly positioned inside the seal and bearing assembly. 2. Pump seal inoperative.</td>
<td>1. Remove seal and bearing from pump. Verify that all components are correctly positioned. 2. Remove seal from pump, inspect it and replace it if worn or damaged. Be sure there are no burrs or other sharp edges on pump shaft or on installation tools that could damage a new seal.</td>
</tr>
<tr>
<td>Adhesive leak at pump-to-hopper interface.</td>
<td>1. O-ring in pump’s rear plate is inoperative. 2. Pump assembly screws are missing or loose. 3. Helicoil insert pulled out of hopper.</td>
<td>1. Remove seal from pump, inspect it and replace it if worn or damaged. Be sure there are no burrs or other sharp edges on the rear plate o-ring groove that could damage a new o-ring. 2. Verify that all four pump screws are tightly assembled to the hopper. 3. Remove pump and inspect hopper. Repair or replace hopper as necessary.</td>
</tr>
</tbody>
</table>
Chapter 8
DISASSEMBLY & RE-ASSEMBLY PROCEDURES

Note: Re-read Chapter 1 “Safety Precautions” before performing any disassembly procedures. All disassembly and repair procedures must be performed by qualified, trained technicians.

Disassembly Procedures
Note: Use the exploded-view drawings referenced with each procedure in conjunction with the instructions outlined in this chapter. Read the “cautions” on page 8-4 before re-assembling the ASU.

To Remove the Access Doors
There are two access doors, one on either side of the ASU. Use the key to unlock the door, then lift it off, being careful not to pull off the ground wire attached. Remove the ground wire and re-attach when the door is re-installed. These doors allow access to: the motor, pump, junction box, (optional) drop-in grids, filter shutoff and (optional) ball valve.

To Open Junction Box
The junction box is on the right-hand side of the hopper. Within the junction box are the thermostats, heater terminals and the hopper sensor. The junction box cover is removed via the two screws at the bottom of the cover.
Sensor or Thermostat Replacement
Remove the junction box cover.
  a. Over-Temperature Thermostat Replacement: Remove the two screws and slip the terminals and the hopper ground wire off of the thermostat before removing the thermostat from the base of the hopper.
  b. Pump Enable Thermostat Replacement: Disconnect two wires from the terminal strip and slide the thermostat out.
  c. RTD Sensor Replacement: Disconnect two wires from the terminal strip and slide the sensor out.

To Remove the Manifold Cover
Unscrew its captive screw and slide cover up and off. Cover allows access to the hose connections on the filter manifold, outlet filters, heaters and the pressure relief.

Heater Replacement
One heater is located in the heater plate underneath the hopper:
  Remove the access door. Use a hex head socket wrench to remove the six heater plate bolts through the holes drilled in the base plate. Disconnect the heater wires. Slide the old heater plate out. Connect heater wires to new plate. Slide new plate in place and fasten with the six bolts.

One cartridge heater is located under the filter manifold:
  At the rear of the ASU, remove the filter manifold cover. Remove the cover located at the end of the heater retainer plate (4 screws). Disconnect heater wires from the terminal rail. Loosen the heater retainer plate and slide the cartridge heater out.

To Access the RTD Sensor in the Optional Drop-in Grid
Remove the access door. Remove the screws on the drop-in grid’s junction box cover in order to remove the cover. Disconnect the sensor from the terminal strip inside the junction box and slide the sensor out of its adapter.
To Access Electrical Components inside the Panel Box
Verify again that the main power is OFF. On the outside of the panel box, use the main disconnect switch to open panel box door (see Chapter 3 for instructions for opening door).

a. **Fuse Replacement:** Fuses are located in the upper right corner of the inside of the panel box assembly. The following printed circuit boards are fused: Motor Control Interface, Power I/O and the optional Clutch board.

b. **Printed Circuit Board Replacement:** Reference the section entitled “Handling Printed Circuit Boards” in Chapter 7. The PCBs are located in the panel box assembly. Refer to detailed layout in Chapter 3.

The PCBs snap into and out of their standoffs. To remove: place your fingertips under one corner of the PCB and pull out firmly from the standoff. Repeat for each corner of the PCB.

Note: aside from fuses and the Lithium battery on the M Series CPU PCB (see Chapter 7), there are no replaceable parts on the PCBs.

**Optional Memory Card Reader Battery Replacement**
Refer to instructions outlined in the Appendix of this manual. See Ch. 3 for installation of Memory Card Reader.
To Access the Pump or Motor

**DANGER HOT SURFACE & HIGH VOLTAGE**

If the pump is not operable but the heating system will function, raise the temperature of the application system to the operating temperature to aid in the pump disassembly process. Otherwise, a heat gun or other controlled heating method is recommended to melt hardened hot melt material. Never use a torch or an open flame on any of the components of the application system. Once the system is up to temperature, disconnect all incoming power before proceeding.

Remove access door(s) using the key, being careful not to pull off the ground wires attached. Turn OFF the filter shutoff valve by turning it to its closed “0” position.

a. **Motor Removal**: Disconnect the wires leading to the motor. Unscrew the hex nut on the cord grip. Slide the wires through the fitting. Remove the four bolts which attach the motor to the mounting bracket. Slide the motor out of the ASU.

For re-assembly: torque should be approximately 1.8 Nm (16 foot/lbs) at room temperature. With hopper at 177°C (350°F), the maximum allowable torque on screws is 4.1 Nm (36 foot/lbs).
b. **Pump Removal:** Verify that the filter shutoff is in its closed “0” position. Loosen motor adapter plate screws and slide adapter plate with motor away from pump and coupling. Slide the coupling off the pump shaft. Remove the four pump mounting bolts.

c. **Pump Seal (O-ring) Replacement:** Remove the pump from the ASU (see instructions above, “b”). Remove the external pump seal from its groove on the back of the pump adapter plate (this is the seal located between the adapter plate and the hopper). Install the new seal.

---

### Re-Assembly Procedures

Unless noted, the M Series ASU’s re-assembly is simply the reverse sequence of the disassembly procedures. However, the following precautions should be followed (whenever they apply) for proper re-assembly:

---

**WARNING HOT SURFACE**

It order to protect personnel and equipment, it is important to replace all insulation whenever it is removed from the ASU.

---

**CAUTION:** In general, all O-RINGS AND SEALS should be replaced whenever hot-melt equipment is re-assembled. All new o-rings should be lubricated with o-ring lube (PN N07588).

**CAUTION:** TAPERED PIPE THREADS are found on air line fittings used with the pump air supply (if applicable) and on the outlet filter manifold. Apply thread sealant (PN N02892) whenever tapered pipe threaded parts are re-assembled.

**CAUTION:** SOME FITTINGS used for adhesive on the ASU have straight threads and o-ring seals. Use of thread sealant is not necessary with these parts, but the o-ring seals should be clean and lubricated. Tighten straight-threaded parts and fittings until their shoulders are firmly seated against the pump body (or other surface). Excessive torque may damage straight-threaded parts and the use of power wrenches is not recommended.

**CAUTION:** HOT-MELT RESIDUE should be cleaned from parts before they are re-assembled, particularly from threaded parts. As a precaution against adhesive residue preventing proper re-assembly, threaded parts should always be re-tightened at operating temperature.
Chapter 9
AVAILABLE OPTIONS & ACCESSORIES

Pressure Gauge Assembly PN 805641
An optional analog pressure gauge can be mounted on the outlet filter manifold. Reading the adhe-
sive pressure at the manifold, rather than in-line on a hose, allows for more precise monitoring of
system pressure. It is also useful for troubleshooting and maintenance.

The gauge is installed at one of the adhesive ports on the manifold. Fittings and adapter are included
in the assembly.

Pre-PSI & Post-PSI Transducers PN 800225; Transducer Assembly PN 108825
A pressure transducer is an electronic probe that allows the melted adhesive’s pressure to be pro-
cessed by the ASU’s control system. They are used to monitor system operating pressures and their
limits. The Pre-PSI transducer measures adhesive pressure in the filter manifold before the filter
basket. The Post-PSI transducer measures the pressure after the filter basket. By comparing the two
readings, the operator can determine if the filter basket is clogged.

Drop-in Grids PN 104802
The drop-in grid is an extra heated grid(s) which is installed near the bottom of the ASU’s hopper.
The additional grid(s) allows faster melting of adhesive for applications requiring higher melt rates
and higher volumes of adhesive. When installed, the drop-in grid becomes an auxiliary temperature
zone on the controller.

High-Temperature Heater Groups
More accurate temperature control may be gained by using a High-Temp Heater Group in the filter
manifold/ pressure relief block. A heater and sensor are contained inside the block and become their
own temperature zone on the controller. Six groups are available depending on the number of filter
manifolds on the ASU.

Filter Options and Accessories:
40 Mesh Outlet Filter PN 101246
Some situations do not call for a fine mesh outlet filter. A “clean” adhesive or one with a long pot
life are examples. Systems utilizing lower temperatures or systems running in a clean environment
can also utilize a 40 mesh filter. Standard equipment on Dynamelt is a 100 mesh filter (PN 101247).

Level Control PN N08122
This device informs the operator, via a message on the DynaControl’s readout, that the hopper’s
adhesive level is low. It may also be wired to stop production, turn on an alarm light or signal, or
signal a PLC.

Baseplate Standoff PN 109585
When casters are not desired on the ASU, baseplate standoffs may be used to make the unit station-
ary. The standoff features a flange on its bottom to allow spot welding and it is open in the center to
allow bolt-through mounting.
Pump Options and Accessories:

Gear Pumps
For higher tolerances and precision, several gear pumps are available for the Dynamelt. Gear pumps give better service for continuous applications or applications which require more control over the volume of adhesive pumped. Gear pumps available are:

**Single Pumps:**
- PN 100860: 1.54 cc/rev single, standard accuracy gear pump
- PN 100861: 3.2 cc/rev single, standard accuracy gear pump
- PN 100862: 4.5 cc/rev single, standard accuracy gear pump
- PN 109690: 10 cc/rev single, standard accuracy gear pump
- PN 108875: 8.5 cc/rev single, high accuracy gear pump
- PN 084E374: 0.584 cc/rev single, high accuracy gear pump
- PN 084E376: 1.752 cc/rev single, high accuracy gear pump
- PN 084E428: 0.297 cc/rev single, high accuracy gear pump
- PN 084E430: 1.168 cc/rev single, high accuracy gear pump
- PN 084E434: 2.920 cc/rev single, high accuracy gear pump

**Dual Pumps:**
Note: all dual pumps require PN 102049, see below.
- PN 100863: 1.54 cc/rev dual, standard accuracy gear pump
- PN 100864: 3.18 cc/rev dual, standard accuracy gear pump
- PN 084E389: 0.584 cc/rev dual, high accuracy gear pump
- PN 084E432: 1.168 cc/rev dual, high accuracy gear pump
- PN 108874: 2.920 cc/rev dual, high accuracy gear pump

**Two Output, Two Filter Manifold PN 102049**
The two output, two filter manifold is required with a dual gear pump. It allows the operator to adjust the two pressure relief valves independently of each other.

Feinpruf Gear Pumps
Feinpruf pumps are commonly used in the European marketplace.

Gear Pump Repair Kit PN 103151
Contains the following items needed to repair the PNs 100860 thru 100864 gear pumps:

<table>
<thead>
<tr>
<th>PN</th>
<th>Description</th>
<th>Qty.</th>
<th>PN</th>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N00198</td>
<td>O-ring</td>
<td>2</td>
<td>069X064</td>
<td>O-ring</td>
<td>3</td>
</tr>
<tr>
<td>018X031</td>
<td>Ball Bearing</td>
<td>5</td>
<td>078F017</td>
<td>Ring, Clip</td>
<td>4</td>
</tr>
<tr>
<td>069X061</td>
<td>Seal</td>
<td>1</td>
<td>078I001</td>
<td>Key, Woodruff</td>
<td>1</td>
</tr>
</tbody>
</table>

Gear Motor Options

Lenze DC Motors PN 103843
These European 1/4 hp motors are equipped with tachometer feedback and a closed loop control. They are required for the Actual Digital RPM Readout option.

DC Motors PN 101418
These 1/4 hp American motors are rated at 83 rpm, 180v.
Return (re-circulating) Hoses
Available on all models. Use of return hoses allows higher adhesive pressures from the head to the substrate because the head is “overfed” adhesive. The overflow adhesive is re-circulated to the hopper.

Electric Clutch PN 105729; Clutch Kit PN 107945
An electric clutch is available for the Dynamelt M 35 ASU. A clutch relieves adhesive pressure quickly in applications where there are periods of time when adhesive is not being applied.

DynaControl Options:
Pendant Control Panel PN 107643
The pendant control option gives the DynaControl keypad mobility via a 9 meter (30 ft), 6 meter (20 ft) or 3 meter (10 ft) cable. The Pendant Control Panel replaces the standard display panel.

Pressure Display PN 108388
The pressure board option enables the controller to read and display adhesive pressure PSI values in the outlet filter manifold. The option consists of a PSI printed circuit board which is used with a pressure reading device (transducer or gauge) mounted on the filter manifold.

Actual Digital RPM Readout PN 107946
This option provides a controller readout for actual motor or pump revolutions per minute. No additional programming is necessary. Installation on an encoder is required.

System Status Lights PN 104280
Remote monitoring of system status is made easier with this tri-color light. The stack light is mounted on a 6” x 6” box, which is itself mounted on a stand with a 10’ cable. Wired into the controller, the lights illuminate to indicate “Power On”, “Ready” and “Alarm”. An audible signal accompanies the “Alarm” light. The alarm may be wired to indicate either high/low temperature, low adhesive level or open/short sensor.

Line Speed Tracking Options
Line speed tracking is a standard feature of the M Series ASUs which allows the speed of the motor and ASU to follow the speed of a production line via a reference voltage input. When operated as the standard feature, a 0-10v signal from a PLC or a similar line speed output device is utilized. However, it may also be operated utilizing one of the following optional devices:
PN 015D050 Tach Generator: a mechanically operated device which produces a reference voltage that allows the ASU’s gear pump to track a parent machine’s production line speed.
PN N06642 Signal Isolator: a device which conditions a parent machine’s production line’s DC speed reference voltage to allow the ASU’s gear pump to track line speed.
Memory Card Reader: PN 107993
The Memory Card Reader is an option which gives the ability to store and transmit system parameters, start signals and setpoints on a credit-card sized card. It is useful for systems which utilize multiple Dynamelt units.

Production security is assured since, with the keypad locked, the card reader prohibits unauthorized changes to the production process.

Serial Communication PN 108475
Bi-directional data transfer to a remote computer is available for the controller. The ASU’s standard RS232 serial port connection allows remote interface up to 50 meters from the DynaControl controller. The RS485 serial port connection offers remote interface over a much longer distance. Either connection enables all system parameters to be monitored and/or controlled from the remote station.

PC Link (Remote I/O Interface) PN 108475
A controller option that allows controller monitoring and programming from a customer-provided programmable logic controller (PLC) or a personal computer (PC).
## Recommended Service Parts List

<table>
<thead>
<tr>
<th>Category</th>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical:</td>
<td>103184</td>
<td>Fuse GDC4 (terminal rail)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>048016</td>
<td>Fuse KTK 15 (terminal rail)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>102762</td>
<td>Fuse, 1 amp (motor control interface pc board)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>104117</td>
<td>Fuse, T6.3A L 5x20 (pc boards)</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>036B103</td>
<td>RTD Sensor, PT</td>
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</tr>
<tr>
<td></td>
<td>104166</td>
<td>Over-Temp Thermostat &amp; Insulator Assy.</td>
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</tr>
<tr>
<td></td>
<td>036B015</td>
<td>Pump Enable Thermostat</td>
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</tr>
<tr>
<td></td>
<td>102411</td>
<td>Boot, Insulator</td>
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</tr>
<tr>
<td></td>
<td>048H384</td>
<td>Solid State Relay, Dual</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>036A170</td>
<td>Heater, 500w (for 1 filter block)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>036A079</td>
<td>Heater, 1000w (for 2 filter blocks)</td>
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</tr>
<tr>
<td></td>
<td>109857</td>
<td>CPU Printed Circuit Board, V5</td>
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</tr>
<tr>
<td></td>
<td>108258</td>
<td>Display CPU Printed Circuit Board</td>
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<td></td>
<td>107440</td>
<td>48-Zone Power (I/O) PC Board</td>
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<tr>
<td></td>
<td>106149</td>
<td>Auxiliary RTD PC Board (optional)</td>
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<tr>
<td></td>
<td>106395</td>
<td>Motor Speed Control A C Drive Board</td>
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<td></td>
<td>110090</td>
<td>Motor Control Interface PC Board</td>
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<tr>
<td></td>
<td>107438</td>
<td>Optional Clutch PC Board</td>
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</tr>
<tr>
<td></td>
<td>106147</td>
<td>Optional Pressure PC Board</td>
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</tr>
<tr>
<td>O-rings:</td>
<td>N00181</td>
<td>O-ring 014 (outlet filter/ manifold)</td>
<td>8 + 6 per manifold</td>
</tr>
<tr>
<td></td>
<td>A69X133</td>
<td>O-ring 124 (outlet filter/ manifold)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>N00185</td>
<td>O-ring 018 (outlet filter/ manifold)</td>
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<td>N00187</td>
<td>O-ring 020 (outlet filter/ manifold)</td>
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<td>O-ring 5-005 (outlet filter/ manifold)</td>
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<tr>
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<td>103771</td>
<td>O-ring 5-254 (outlet filter/ manifold)</td>
<td>2</td>
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<td>807729</td>
<td>Pump Shaft Seal (Zenith/ TSHA pump models)</td>
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<td>069X061</td>
<td>Pump Shaft Seal (optional ITW Dynatec pumps)</td>
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<td>Check Valve (pressure relief)</td>
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<td>Motor Brushes, Lenze (optional Lenze motor)</td>
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Chapter 10
COMPONENT ILLUSTRATIONS & BILLS OF MATERIAL

Chapter Format

This chapter contains the component illustrations (exploded-view drawings) for each assembly of the DYNAMELT M SERIES ASU. These drawings are useful for finding part numbers as well as for use when maintaining or repairing the unit.
Bill of Materials for Pressure Relief & High Temp. Filter Block Assembly #102710
(Items from Heater Control Groups: 103571, 103572, 103573, 103574 are also included in this illustration and bill of material.)

<table>
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<td>N00753</td>
<td>1/8 NPT Level Seal Plug</td>
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<td>N00187</td>
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<td>N00754</td>
<td>1/4 NPT Level Seal Plug</td>
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<td>3/8 BSPPP Plug</td>
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<td>Filter Block Insulator Plate</td>
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<td>A 69X 133*</td>
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<td>A 78A 282*</td>
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<td>3/4-16 Jam Nut</td>
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<td>102719*</td>
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<td>Filter Preload Wave Spring</td>
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<td>O-ring, 5-254</td>
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<td>036A 170</td>
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<td>104163</td>
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Note: *These items are included in 108012 Plug Assembly
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<td>Panel Box Lock Kit</td>
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<td>103378</td>
<td>Wire duct, 2” W x 3” H</td>
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<td>103439</td>
<td>Wire Duct Cover, 1.5”</td>
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<td>103438</td>
<td>Wire Duct Cover, 2.25”</td>
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<td>048H384</td>
<td>SSR Dual 40A, 240VAC</td>
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Continued on pages 6 thru 7.
Optional Pendant Control
Bill of Materials for Typical Electrical Panel Box Assembly 107715 (Cont. from pg. 4)

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## Bill of Materials for DYNAMETL M35 Series Cabinet Assembly

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<td>M 6 Flat Washer</td>
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Note: without the transformer option the casters attach to the base plate. With the transformer option the casters attach to the transformer frame. Stand-off option attaches to Base plate only.
## Bill of Materials for AC Dual Drive 107943 & AC Single Drive Assembly PN 107942

<table>
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<th>Dual Qty.</th>
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<td>Motor Bracket</td>
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Component Illustration: DYNAMELT AC Drive Assembly 107942 & 107943

Digital RPM Readout Option

Electric Clutch Option in place of coupling
# Bill of Materials for DYNAMELT M35 Melt & Grid Assemblies.

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### Bill of Materials for 1.54 cc / Rev. , Single Gear Pump Assembly # 100860
### Bill of Materials for 3.2 cc / Rev. , Single Gear Pump Assembly # 100861

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<td>100866 / 100867</td>
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Pump # 100860 has one bearing in this Shaft
Pump # 100861 has two bearing in this shaft

In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104042 M10-1.5 x 100 All Thread
Bill of Materials for 4.50 cc / Rev. , Single Gear Pump Assembly # 100862

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<td>018X031</td>
<td>Ball, 1/8” Diameter</td>
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<tr>
<td>10</td>
<td>012C018</td>
<td>Drive Gear, 4.5 cc/rev</td>
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<td>11</td>
<td>069X064</td>
<td>Pump Seal</td>
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<td>12</td>
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<td>Shaft Retaining Ring</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>018X041</td>
<td>Bearing Sleeve, Rear Plate</td>
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<td>14</td>
<td>100865</td>
<td>Rear Plate Assembly</td>
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<td>15</td>
<td>100908</td>
<td>M4 x 25 SHC Screw</td>
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<tr>
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<td>104776</td>
<td>M10-1.5 x 80mm</td>
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<td>M10 Flat washer</td>
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</table>
In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104042 M10-1.5 x 100 All Thread
Bill of Materials for 1.54 cc / Rev. , Dual Gear Pump Assembly # 100863

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part Number</th>
<th>Description</th>
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<td>2</td>
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<td>Key, Woodruff</td>
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<tr>
<td>3</td>
<td>101626</td>
<td>M5 x 12 SHCS</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>069X160</td>
<td>Seal retainer &amp; Bearing Housing</td>
<td>1</td>
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<tr>
<td>5</td>
<td>069X061</td>
<td>Lip Seal</td>
<td>1</td>
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<tr>
<td>6</td>
<td>018X041</td>
<td>Bearing Sleeve</td>
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<td>7</td>
<td>100866</td>
<td>Front Plate Assembly</td>
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</tr>
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<td>8</td>
<td>012D082</td>
<td>Driven Gear Shaft</td>
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<td>Ball, 1/8” Dia.</td>
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<td>Pump Gear, 1.5 cc/Rev</td>
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<td>069X064</td>
<td>O-ring, -041</td>
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</tr>
<tr>
<td>12</td>
<td>078F017</td>
<td>Shaft Retaining Ring</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>018X041</td>
<td>Bearing Sleeve, rear Plate</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>100865</td>
<td>Rear Plate Assembly</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>101692</td>
<td>M4 x 35 SHCS</td>
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<td>16</td>
<td>NPN</td>
<td>M10-1.5 x 85mm SHC Screw</td>
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<td>Middle Plate</td>
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<tr>
<td>18</td>
<td>N00198</td>
<td>O-ring, -113</td>
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<tr>
<td>19</td>
<td>NPN</td>
<td>M10 Flat Washer</td>
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</table>
In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104073 M10-1.5 x 105 All Thread
In some cases the pumps are mounted with the following hardware:
104158 M10 Flange Nut
104073 M10-1.5 x 105 All Thread

Bill of Materials for 3.2 cc / Rev., Dual Gear Pump Assembly # 100864

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<td>101626</td>
<td>M5 x 12 SHCS</td>
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<tr>
<td>4</td>
<td>069X160</td>
<td>Seal retainer &amp; Bearing Housing</td>
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<tr>
<td>5</td>
<td>069X061</td>
<td>Lip Seal</td>
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<td>6</td>
<td>018X041</td>
<td>Bearing Sleeve</td>
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<td>100867</td>
<td>Front Plate Assembly</td>
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<td>012D087</td>
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<td>069X064</td>
<td>O-ring, -041</td>
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</tr>
<tr>
<td>12</td>
<td>078F017</td>
<td>Shaft Retaining Ring</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>018X041</td>
<td>Bearing Sleeve, rear Plate</td>
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<td>14</td>
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<td>Rear Plate Assembly</td>
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<td>101691</td>
<td>M4 x 40 SHCS</td>
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<td>16</td>
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<td>M10-1.5 x 85mm</td>
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<td>17</td>
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<td>Middle Plate</td>
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<td>18</td>
<td>N00198</td>
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### Bill of Materials for 10cc Single Gear Pump Assembly #109690

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<td>Snap ring, 1/2&quot;</td>
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<td>3</td>
<td>078I001</td>
<td>Key Woodruf, #404</td>
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<td>4</td>
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<td>Shaft Seal</td>
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</tr>
<tr>
<td>5</td>
<td>069X064</td>
<td>O-ring, -041</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>100908</td>
<td>M4-0.7 x 25mm SHC Screw</td>
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<td>101626</td>
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<td>109686</td>
<td>Rear Bearing Plate 10cc Rev.</td>
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<td>001U002</td>
<td>Dow Corning 112 Lubricant (Not Shown)</td>
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Bill of Materials for Assorted Pump Adapter Assemblies

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<td>069X274</td>
<td>Seal Dual Pump to Progmelt (not part of this assembly)</td>
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<td>N00190</td>
<td>O-Ring #24</td>
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<td>084E374</td>
<td>TSHA .584 cc Single Outlet</td>
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<td>084E430</td>
<td>TSHA 1.168 cc Single Outlet</td>
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<td>084E434</td>
<td>TSHA 2.292 cc Single Outlet</td>
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<td>084E406</td>
<td>108875</td>
<td>TSHA 8.5 cc Single Outlet</td>
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<tr>
<td>084E406</td>
<td>084E438</td>
<td>TSHA 30.0 cc Single Outlet</td>
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<td>TSHA .584 cc Dual Outlet</td>
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<td>TSHA 30.0 cc Single Outlet</td>
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<td>TSHA .584 cc Dual Outlet</td>
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<td>TSHA 1.168 cc Dual Outlet</td>
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<td>Feinpruef Pump 1.2 cc</td>
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<td>Feinpruef Pump 2.4 cc</td>
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<td>104351</td>
<td>Coupling Half (Not Shown, See drive Section)</td>
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THSA Pump Adapter Assembly 084E406

THSA Pump Adapter Assembly 084E419

Feinpruef Pump Adapter Assembly 103923
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<td>104325</td>
<td>Fitting Adapter, Swivel, 6J x 1/4 MPT</td>
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<td>4</td>
<td>805632</td>
<td>Fitting, 1/4 NPT 1/2-20 Tranducer</td>
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<td>Drawing:</td>
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<tr>
<td>Hose Schematic, ASU to Applicator</td>
<td>page 11-2</td>
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<tr>
<td>Applicator Head Schematic</td>
<td>page 11-3</td>
<td></td>
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<tr>
<td>Flow Diagram, Outlet Filter Manifold</td>
<td>page 11-4</td>
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<tr>
<td>Typical Hydraulic Schematic</td>
<td>page 11-5</td>
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<tr>
<td>Optional System Status Lights Schematic</td>
<td>page 11-5</td>
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<tr>
<td>Optional Level Control Schematic</td>
<td>page 11-6</td>
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<tr>
<td>Optional Electric Clutch Schematic</td>
<td>page 11-7</td>
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<tr>
<td>Grounding Diagram, CE Mark</td>
<td>page 11-8</td>
<td></td>
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<tr>
<td>Power Wiring Diagram, 240v</td>
<td>page 11-9</td>
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<tr>
<td>Signal Wiring Diagram, 4Hose/4Head, 240v</td>
<td>page 11-10</td>
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<tr>
<td>Power Wiring Diagram, 380v</td>
<td>page 11-12</td>
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<tr>
<td>Instruction Sheet for Pump &amp; Zone Configuration</td>
<td>page 11-13</td>
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<td>Special ASU Schematics (if applicable)</td>
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HOSE SCHEMATIC PN 101082 REV. E
ASU to Applicator, Dynacontrol
Notes:
1. ALL WIRE MIL-W-22759/10 OR 12, MINIMUM 600 VOLTS, 260 DEG. C
2. SOLENOID(S) VOLTAGE AND TIMING METHOD DEPENDS ON APPLICATION.
3. RTD WILL BE PLATINUM 100 OHM.
**Function of Outlet Filter Manifold's Closeable Cross Channel**

A Closeable Cross Channel Plug is located inside the Outlet Filter Manifold to prevent adhesive flow between the two outlet filters when a dual pump is in use.

When a single pump is used, ITW Dynatec removes the Cross Channel Plug.

When changing an ASU from a single to a dual pump, or vice versa, consult ITW Dynatec for complete instructions.

*The second Adhesive In and Adhesive Return ports are not shown.*
TYPICAL HYDRAULIC SCHEMATIC: Single Pump, Motor, Bypass, Filter, optional Transducer & optional Pressure Gauge

WIRING DIAGRAM FOR PN 108266 OPTIONAL SYSTEM STATUS LIGHTS
NOTE 1: TERMINALS "AH1" AND "AN1" ARE IN PANEL BOX. TERMINALS "CL1" THRU "CL6" ARE ADDED WITH CLUTCH OPTION. MOUNT IN PANEL BOX NEAR "AH1" AND "AN1" TERMINALS. CLUTCH WILL NOT OPERATE WITHOUT CUSTOMER SUPPLIED CONTACT ON JUMPER.

NOTE 2: MOUNT CLUTCHES BETWEEN MOTOR AND PUMP SHAFTS. SECURE CLUTCHES TO ENSURE THEY WILL NOT ROTATE.
GROUNDING DIAGRAM, CE MARK, PN 804704 REV. E
PN 107939 POWER WIRING DIAGRAM, DM35 DCL, 380V
Zone Configuration for Hose/Head/Aux.

M35

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Hose Head Aux.
| 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 |

M70/140

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Hose Head Aux.
| 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 |

M210

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Hose Head Aux.
| 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 |

NOTES:

1. There are no odd hose numbers in the predefined defaults, if for example 5 hoses are installed, the default has to be loaded for 6 if necessary, remove hose #6 manually from the zone table.

2. Indicates the division line between the two hoppers if dual hoppers are installed.

3. These zone numbers are independent from number of pumps and premelt grids.
Zone Configuration for Prog Melts / Filterblock / Pumps

M10 / M70 / 140

M35
DYNATEC/ ZENITH STANDARD ACCURACY GEAR PUMPS
INSTALLATION, CARE & MAINTENANCE MANUAL

PN 084E427, 084E429, 084E431, 084E433, 084E435, 084E437

<table>
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<tr>
<th>Part Number</th>
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<th>Output/Rev</th>
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</table>

Thoroughly read and understand this entire manual before installation and operation of pump.

Note: The instructions given herein cover the description, installation, operation and maintenance of subject equipment. Dynatec and Zenith reserve the right to make engineering refinements that may not be reflected in this bulletin.

Manual revised 8/94
INTRODUCTION

In 1926, Zenith Pumps was approached by the synthetic fiber industry to design a pump to provide a precise, pulseless, repeatable flow and assure better quality control. The options then were the same as those in the chemical process industry today: diaphragm, lobe, coarse gear, piston, plunger and screw pumps. Each had problems with pulsation, flow inaccuracies, multiple seal areas and slippage, which required constant calibration, high maintenance and extended downtimes.

Zenith Pumps met the challenge and designed a rotary external gear pump of unique precision and simplicity. Manufacturing techniques were developed to hold tolerances to .00005", and an internal pressure relief mechanism assured reliable precision metering. The pump’s simple design of only three moving parts - two metering gears and a drive shaft - provided long life and easy maintenance.

For years since, chemical engineers have relied on Zenith to provide precision fluid handling solutions for their most difficult pumping applications. Zenith gear pumps can be found wherever precise, pulseless, repeatable metering of fluids is required.

BENEFITS

High Accuracy
Stable, repeatable flows are assured even under varying conditions of pressure, viscosity and temperature.

High Temperature Capability
Operating temperatures to 450 degrees F (232 degrees C).

Maximum Life
Only three moving parts; components are through-hardened tool and die steels to 56 HRc or better. The bodies are cast nodular iron. Replaceable sleeve bearings for low-cost rebuilds.

High Volumetric Efficiency
Maximum efficiency is achieved with optimum operating clearances and assured under pressure by built-in alignment pins.

Minimum Pulsation
Unique design offers virtually pulseless flow without valves or flexible elements to hinder performance.

Precision Construction
Ground and lapped components for close control of operating clearances.
SPECIFICATIONS

**Pump Type:** Rotary external spur gear, single stream.

**Rotation:** Clockwise

**Operating Speed:** 3 - 120 rpm depending upon application conditions and fluid viscosity.

**Temperature:** To 450 degrees F (232 degrees C)

OPERATION

All Dynatec/ Zenith High Accuracy Pumps are rear ported. Fluid enters the pump through a port drilled into the rear side plate (the side opposite the drive shaft). The fluid fills the exposed gear tooth volumes and is transported around the outer diameter of the gear pocket. As the gears mesh together, the fluid is displaced in a very precise amount out through the discharge port that is drilled alongside the inlet port in the rear plate.

Since these pumps are not self-priming, a flooded suction is usually the minimum inlet pressure required. However, when high-viscosity fluids are used, more time is required to fill the tooth volumes. As a result, the inlet pressure must be increased, or the gears must rotate at a slower speed to ensure complete volume filling and to prevent cavitation.

Dynatec/ Zenith pumps rely on the metered fluid for lubrication of internal bearing areas. The pump should never be allowed to run dry or be allowed to run with non-lubricating fluids such as water. Because of the close clearances in the bearing areas, lack of sufficient lubrication can cause pump seizure or some other catastrophic failure.

Slippage will occur across the faces of the gears from the high-pressure side to the low-pressure side. The amount of slippage depends on four factors: fluid viscosity, speed, differential pressure and pump clearances. Under reasonably stable operating conditions, slippage is repeatable and predictable and pump operation can be adjusted to compensate.

The Standard Accuracy Pumps are designed for high-temperature and high-pressure operation. As such, operating temperatures to 450 degrees F can be achieved.

INSTALLATION

Pumps should be carefully unpacked to make sure that the shipment is complete. If any items are missing or damaged, the freight carrier and Dynatec should be notified immediately.

While the pump is composed of steel, it is a precision instrument. Dropping the pump or hitting with a non-yielding material can cause serious damage to the components. All materials are through-hardened to maximum hardness resulting in brittle material. Treat cont.
them as you would any other precision gauging instrument.

Dynatec/Zenith pumps are shipped filled with a rust preventive oil. Flush the oil throughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.

After flushing, the pump should be lubricated internally for start-up purposes. Pour a suitable high-temperature lubricant (silicone oil) into the inlet port. Rotate the metering gears until lubricant appears at the discharge port.

Mount the pump to a block with a flatness of true flat to .0001" convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and block. Mounting bolts should be a Grade 8 or better. Make sure mounting bolts are lubricated with a high-temperature anti-seize compound such as DAG Dispersion #154. Bolts should be alternatively torqued in even increments up to Dynatec’s recommended limit for the bolt size used. See Table 1 on page 10 for torque values.

The following is a brief “standard” installation procedure. For any special applications, considerations or simply to ask our advice, please contact Dynatec.

**TO PREPARE THE PUMP FOR USE:**
1. Always flush out the plumbing system before connecting the pump.
2. Filters should be installed prior to the pump inlet that filter ideally to half the pump running clearances.
3. Turn pumps by hand before running. Pumps should turn freely.
4. Engage the outer drive shaft carefully, making sure that it does not bottom in the slot of the coupling* and that it is aligned within one degree angular and .005” parallel with the true pump drive axis. (*Note: the coupling is the rotating member of the seal and depends on the internal operating pressure of the pump to force it forward and effect a seal against the carbon or metal seal plate.)
5. Tighten the mounting bolts and coupling housing screws to Dynatec recommended torque at room temperature.
6. Make sure fluid is in the pump before starting.
7. Start pump slowly and, if possible, run it with a lubricating fluid.
8. When satisfactory operation is achieved, the pump and system may be gradually brought up to normal process speeds and pressures.
9. If at any time during operation the pump does not appear to be running smoothly, stop the pump immediately to avoid any serious internal damage.

**CLEANING, INSPECTION AND REPAIR**

**REMEMBER:** Dynatec/Zenith metering pumps are made for exacting duty. In order to develop the high pressure demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. All parts are machined to extreme accuracy; critical dimensions are held between one and two ten-thousandths of an inch (.0001”/.0002”). Because of these close running clearances, cont.
these pumps require careful maintenance and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure. These pumps are precision instruments; you can’t keep them too clean. Please treat them with care, and if it’s at all possible, set aside a separate clean area for pump maintenance.

To clean High Accuracy Metering Pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to the pump size and the degree of polymer contamination and should be determined by trial. Note: Careful control of the furnace temperature (700 degrees F max.) and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness will draw back and the dimensional stability of the pump may be upset.

Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath should be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3 and 12 hours, depending on the polymer type, temperature, pump size and furnace load.

CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. It may be necessary to disassemble the seal arrangement to remove polymer ash.

If present, always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high-temperature lubricant to prepare it for return to service. To store for future use, simply add a rust preventative oil.

It is recommended that pump users institute a program of dimensional inspection of critical parts in order to keep maintenance and operating costs at a minimum. By noting the performance of a pump immediately before removing it from service and correlating the performance to measured component wear, the user can establish the maximum wear limits for the pump’s critical components. Further, he can predict the service life of the pump and schedule his down-time accordingly.

As with any other Dynatec pump, high accuracy pumps may be returned to Dynatec for complete rehabilitation as necessary. This procedure may be desirable if only a few pumps are involved. If a large number of pumps are to be maintained at the user’s plant, it may be worthwhile to have key personnel attend a maintenance seminar at the Zentih factory to view the manufacturing, gauging and assembly techniques involved in producing the pumps. Please contact Dynatec (at 1-800-538-9540) for further information on these items.
STANDARD ACCURACY PUMP DISASSEMBLY

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate “clean” area for assembly, testing and storing of rebuilt pumps.

If maintenance is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct re-assembly. Refer to assembly drawing (located in the back of this manual) for your correct pump type.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove pins (10) and arbor (5) with an arbor press in the direction which disengages the press fit in the shortest distance.

NOTE: Dowels and arbors for the standard accuracy pumps are press fit in the gear/ rear plate.

4. Separate the plates by pry slots that are available in the pump. Great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.
5. After disassembly, clean all components in a non-destructive solvent.
6. Wash components in an ultrasonic cleaning tank and air dry. Be careful not to bang parts together.
7. Inspect all parts for nicks, burrs, score marks and other signs of wear. The plates and faces of the gears may be hand blocked on 600 grit paper and any nicks, burrs or sharp edges can be lightly removed with a honing stone. Be careful not to round off the edges of the gear teeth while lapping.

CAUTION: Since the thickness relationship between the metering gears and the gear/ rear plate is critical to metering performance, and the gear/ rear plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.

Place a layer of 600 Grit Emery Cloth on a lapping block or plate-a granite flat is suitable. Apply light pressure to the component and turn it in a figure-8 fashion (as shown in Figure 1) approximately five times until a smooth finish appears. Turning in a circular fashion, or other non-uniform motion, may cause the ground holes to lose their perpendicularity to the faces.

Always use clean, lint-free rags and compressed air to clean components. Paper towels are not acceptable; they may leave small pieces of paper and dust on the components. Use chemical brushes to clean between gear teeth, bores and reliefs.

8. Replace sleeve bearings as necessary and hone in the plate to the original new part specifications.
9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area, commonly referred to as the “throat”, is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the
high-pressure discharge port section across the throat to the lower inlet port, reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

10. After all components are “hospital clean”, the pump is ready for assembly.

![Figure 1](image)

**STANDARD ACCURACY PUMP RE-ASSEMBLY**

**NOTE:** During and between each re-assembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in re-assembling or turning a Dynatec pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely. Re-assemble as follows:

1. After all worn parts have been re-finished or replaced, all parts should be thoroughly cleaned in a solvent and dried.

2. Using the driven gear (5) as an up-righting fixture, carefully locate the arbor (7) over its press-fit hole in the gear/ rear plate. Smoothly drive the arbor into its hole with the help of an appropriate arbor press.

3. Place the gear/ rear plate (1) with the arbor in position in a soft-jaw vise or holding fixture.

4. Slip together the driving metering gear (6), drive shaft (4), key (8) and retaining rings (21). Position in the front of the gear/ rear plate.

5. Place the driven metering gear on its arbor and carefully mesh with the drive metering gear.

6. **NOTE:** Repeat steps 3 through 5 for four-gear pumps.

7. Position the front side plate (3).

8. Rotate the gears to ensure free rotation.

9. Press the roll pins (41) into place.

10. Lubricate the binder screws (23) with DAG dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer’s recommended limit. It is especially important to rotate the gears frequently during this operation.

11. Re-assemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 600 grit paper. When using a carbon seal, the coupling housing screws (27) should be torqued to the manufacturer’s recommended limit. For pumps with a compensation packing seal, be sure all old packing is removed...
from the packing housing.

12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn. Worn shafts will result in premature seal leakage and should be replaced.

13. Inspect lip seals for wear, cracks and abrasions. Replace if needed.

14. Pack lip seals (15) with a silicone-based grease and lubricate with Parker Super-O-Lubricate or an equivalent silicone-based oil.

15. Install lip seals (15) into seal housing (9) as shown.

16. Tighten seal housing screws (22) in a cross pattern to 60 lbs./in. Check for free rotation.

**SCREW TORQUE VALUES** (Standard Alloy Steel)*

<table>
<thead>
<tr>
<th>Screw Size &amp; Thread</th>
<th>Torque (Lubricated Threads)</th>
<th>N·m</th>
<th>Lbs.-ft.</th>
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<td>7.2 [5.3]</td>
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<td>[120]</td>
<td>13.6 [10]</td>
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<td>1/4-20</td>
<td>[150]</td>
<td>16.9 [12.5]</td>
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<td>5/16-18</td>
<td>[305]</td>
<td>33.9 [25]</td>
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</tr>
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<td>3/8-16</td>
<td>[360]</td>
<td>40.6 [30]</td>
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<td>7/16-14 block (hopper)</td>
<td>[480]</td>
<td>54.2 [40]</td>
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Table 1

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed of type H-11 high-temperature alloy steel provide extremely high creep resistance.*
# TROUBLESHOOTING GUIDE

**Trouble** | **Probable Cause** | **Remedy**
--- | --- | ---
Pump will not turn. | 1. Low pump temperature. | Check temperature sensor and control loop for proper setting/operation. Allow sufficient heat-up time.
 | 2. Drive malfunction. | Verify drive is powered. Check to assure all alarm circuits are clear. Check drive motor current and speed settings. Check all drive couplings.
 | 3. Process conditions changed. | Check process conditions for proper melt temperature, pressures, viscosities and materials.
 | 5. Possible internal damages. | Return pump to ITW Dynatec for repair.

Excessive seal assembly leakage | 1. Worn seal plate. | Return pump to ITW Dynatec for repair.
 | 2. Insufficient inlet pressure. | Increase inlet pressure.
 | 3. Worn lip seal.* | Replace lip seal.

Reduced pump efficiency | 1. Worn gear(s). | Return pump to ITW Dynatec for repair.
 | 2. Worn bearings. | Return pump to ITW Dynatec for repair.
 | 3. Process conditions changed. | Consult factory for clearance recommended on new process conditions.

* A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.
NOTES:

-etch part number & displacement at location shown with minimum .25 high characters.
-All parts are to include four 7/8-14 screws, head cap screws, items 12G, grade 8 & black oxide, 3.25" long, and five washers, items 15/16, for mounting.

2X Ø .386 MOUNTING BOLT HOLES
2X Ø .250 OUTLET PORT
2X Ø .250 OUTLET PORT
2X Ø .250 ROLL PIN
2X Ø .469 MOUNTING BOLT HOLES
Φ .813 INLET PORT

SECTION A-A

NOTE:

AFTER ASS'Y, MATCH -2- DRILLED HOLES FOR ROLL PINS

DYNATEC/ZENITH HIGH ACCURACY GEAR PUMPS
INSTALLATION, CARE & MAINTENANCE MANUAL

PN 084E428, 084E430, 084E432, 084E434, 084E436

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<th>Output/Rev</th>
<th>Shaft Seal PN</th>
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<td>Tool Steel</td>
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BENEFITS

High Accuracy
Stable, repeatable flows are assured even under varying conditions of pressure, viscosity and temperature.

High Temperature Capability
Operating temperatures to 550 degrees F (288 degrees C).

Maximum Life
Only three moving parts; components are through-hardened tool and die steels to 62 HRc or better. Replaceable sleeve bearings for low-cost rebuilds.

High Volumetric Efficiency
Maximum efficiency is achieved with optimum operating clearances and assured under pressure by built-in alignment dowels.

Minimum Pulsation
Unique design offers virtually pulseless flow without valves or flexible elements to hinder performance.

Precision Construction
Ground and lapped components for close control of operating clearances.
SPECIFICATIONS

**Pump Type:** Rotary external spur gear, single stream.

**Rotation:** Clockwise

**Operating Speed:** 3 - 120 rpm depending upon application conditions and fluid viscosity.

**Temperature:** To 550 degrees F (288 degrees C)

DESIGN

Dynatec/ Zenith High Accuracy Metering Pumps consist of two gears rotating in mesh within a closely fitted housing that is comprised of three plates. The center gear plate fits closely around the outside diameter of the metering gears. The front and rear plates sandwich the center plate and restrict axial movement of the gears. Power is transmitted to the gears by the drive shaft which is a through shaft. Shaft sealing is accomplished with a high temperature cup seal.

High-accuracy pumps are precision instruments requiring skilled and careful maintenance. Constructed of high-quality tool and die steels such as AISI D2, M2, M4 and CPM-M4, or other high-performance alloys, they are tempered after heat treatment to hardnesses ranging from HRc 58 to HRc 64. Since the thermal expansion rates for all three steels are almost identical and are otherwise entirely compatible, it is possible to combine them so as to take advantage of their best qualities in the most economical way.

The Type D2 tool steel is often selected for the side and center plates as it offers good abrasion resistance and it is the most economical of the three steels we most commonly use. Type D2 will also provide a higher degree of corrosion resistance than M2 or M4.

The portion of the side plate subject to the most wear is the shaft bearing hole, which has an easily replaceable, inexpensive sleeve bearing that can be made of the extremely wear resistant Type M4 tool steel. Types M2 and CPM-M4 steels are commonly used for the metering gears, drive shaft and universal seal coupling, due to their superior torsional strength and abrasion resistance for these items that are the most critical to proper metering performance.

OPERATION

All Dynatec/ Zenith High Accuracy Pumps are rear ported. Fluid enters the pump through a port drilled into the rear side plate (the side opposite the drive shaft). The fluid fills the exposed gear tooth volumes and is transported around the outer diameter of the gear pocket. As the gears mesh together, the fluid is displaced in a very precise amount out through the discharge port that is drilled alongside the inlet port in the rear plate.
Since these pumps are not self-priming, a flooded suction is usually the minimum inlet pressure required. However, when high-viscosity fluids are used, more time is required to fill the tooth volumes. As a result, the inlet pressure must be increased, or the gears must rotate at a slower speed to ensure complete volume filling and to prevent cavitation.

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The High Accuracy Pumps are designed for high-temperature and high-pressure operation. As such, operating temperatures to 550 degrees F can be achieved.

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Pumps should be carefully unpacked to make sure that the shipment is complete. If any items are missing or damaged, the freight carrier and Dynatec should be notified immediately.

While the pump is composed of steel, it is a precision instrument. Dropping the pump or hitting with a non-yielding material can cause serious damage to the components. All materials are through-hardened to maximum hardness resulting in brittle material. Treat them as you would any other precision gauging instrument.

Dynatec/ Zenith pumps are shipped filled with a rust preventive oil. Flush the oil thoroughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.

After flushing, the pump should be lubricated internally for start-up purposes. Pour a suitable high-temperature lubricant (silicone oil) into the inlet port. Rotate the metering gears until lubricant appears at the discharge port.

Mount the pump to a block with a flatness of true flat to .0001” convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and block. Mounting bolts should be a Grade 8 or better. Make sure mounting bolts are lubricated with a high-temperature anti-seize compound such as DAG Dispersion #154. Bolts should be alternatively torqued in even increments up to Dynatec’s recommended limit for the bolt size used. See Table 1 on page 26 for torque values.

The following is a brief “standard” installation procedure. For any special applications, considerations or simply to ask our advice, please contact ITW Dynatec.
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Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath should be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3 and 12 hours, depending on the polymer type, temperature, pump size and furnace load.

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If present, always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high-temperature lubricant to prepare it for return to service. To store for future use, simply add a rust preventive oil.

It is recommended that pump users institute a program of dimensional inspection of critical parts in order to keep maintenance and operating costs at a minimum. By noting the performance of a pump immediately before removing it from service and correlating the performance to measured component wear, the user can establish the maximum wear limits for the pump's critical components. Further, he can predict the service life of the pump and schedule his down-time accordingly.

As with any other Dynatec pump, high accuracy pumps may be returned to Dynatec for complete rehabilitation as necessary. This procedure may be desirable if only a few pumps are involved. If a large number of pumps are to be maintained at the user's plant, it may be worthwhile to have key personnel attend a maintenance seminar at the Zentih factory to view the manufacturing, gauging and assembly techniques involved in producing the pumps. Please contact Dynatec (at 1-800-538-9540) for further information on these items.

HIGH ACCURACY PUMP DISASSEMBLY

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenance is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct re-assembly. Refer to assembly drawing (located in the back of this manual) for your correct pump type.

1. Remove the seal arrangement.
2. Remove all binder screws.
3. Remove dowels (10) and arbor (5) with an arbor press in the direction which disengages the press fit in the shortest distance.

NOTE: Dowels and arbors for the high accuracy pumps are press fit in the rear front plate (1) and slip fit in the center (2) and side plates (3).
4. Separate the plates by pry slots. Great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.

5. After disassembly, clean all components in a glass bead blast cabinet to remove any debris remaining after heat cleaning. Alternative, non-destructive cleaning methods such as water jet or solvents are also acceptable.

6. Wash components in an ultrasonic cleaning tank and air dry. Be careful not to bang parts together.

7. Inspect all parts for nicks, burrs, score marks and other signs of wear. The plates and faces of the gears may be hand blocked on 400/600 grit paper and any nicks, burrs or sharp edges can be lightly removed with a honing stone. Be careful not to round off the edges of the gear teeth while lapping.

**CAUTION:** Since the thickness relationship between the metering gears and the center plate is critical to metering performance, and the center plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.

Place a layer of 400 Grit Emery Cloth on a lapping block or plate—a granite flat is suitable. Apply light pressure to the component and turn it in a figure-8 fashion (as shown in Figure 1) approximately ten times until a smooth finish appears. Turning in a circular fashion, or other non-uniform motion, may cause the ground holes to lose their perpendicularity to the faces.

Always use clean, lint-free rags and compressed air to clean components. Paper towels are not acceptable; they may leave small pieces of paper and dust on the components. Use chemical brushes to clean between gear teeth, bores and reliefs.

8. Replace sleeve bearings as necessary and hone in the plate to the original new part specifications.

9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area, commonly referred to as the “throat”, is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the high-pressure discharge port section across the throat to the lower inlet port, reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.

10. After all components are “hospital clean”, the pump is ready for assembly.
HIGH ACCURACY PUMP RE-ASSEMBLY

NOTE: During and between each re-assembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in re-assembling or turning a Dynatec pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely. Re-assemble as follows:

1. After all worn parts have been re-finished or replaced, all parts should be throughly cleaned in a solvent and dried.
2. Using the driven gear (7) as an up-righting fixture, carefully locate the arbor (5) over its press-fit hole with the help of an appropriate arbor press.
3. Place the rear side plate (3) with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear (6), drive shaft (4), key (8) and retaining ring. Position in the front of the side plate by installing the drive shaft through the bearing (49).
5. Place the driven metering gear on its arbor and carefully mesh with the drive metering gear.
6. Carefully lower the center plate (2) over the gears.

NOTE: Repeat steps 5 and 6 for four-gear pumps, placing the middle plate between gear plates.
7. Position the front side plate (1).
8. Rotate the gears to ensure free rotation.
9. Press the dowels (10) into place moving in the direction of the shortest press distance. (Usually from the rear side of the pump.)
10. Lubricate the binder screws (47, 48) with DAG dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer’s recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Re-assemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 400/600 grit paper. When using a carbon seal, the coupling housing screws (27) should be torqued to the manufacturer’s recommended limit. For pumps with a compensation packing seal, be sure all old packing is removed from the packing housing.
12. Inspect the drive shaft at the seal area making sure that it is not scored, shouldered or worn. Worn shafts will result in premature seal leakage and should be replaced.
13. Pack lip seals (15) with a silicone-based grease and lubricate with Parker Super-O-Lubricate or an equivalent silicone-based oil.
14. Install lip seals into seal housing (22) as shown.
15. Tighten seal housing screws to 60 lbs./in. Check for rotation.
**TROUBLESHOOTING GUIDE**

**Trouble** | **Probable Cause** | **Remedy**
---|---|---
Pump will not turn. | 1. Low pump temperature. | Check temperature sensor and control loop for proper setting/operation. Allow sufficient heat-up time.
 | 2. Drive malfunction. | Verify drive is powered. Check to assure all alarm circuits are clear. Check drive motor current and speed settings. Check all drive couplings.
 | 3. Process conditions changed. | Check process conditions for proper melt temperature, pressures, viscosities and materials.

---

**SCREW TORQUE VALUES** (Standard Alloy Steel)*

<table>
<thead>
<tr>
<th>Screw Size &amp; Thread (UNC Alloy Steel)</th>
<th>Torque (Lubricated Threads)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lbs.-in.</td>
</tr>
<tr>
<td>#10-24 (w/ carbon seal gasket)</td>
<td>50</td>
</tr>
<tr>
<td>#10-24 (w/o carbon seal gasket)</td>
<td>64</td>
</tr>
<tr>
<td>#12-24</td>
<td>120</td>
</tr>
<tr>
<td>1/4-20</td>
<td>150</td>
</tr>
<tr>
<td>5/16-18</td>
<td>305</td>
</tr>
<tr>
<td>3/8-16 into aluminum</td>
<td>360</td>
</tr>
<tr>
<td>7/16-14 block (hopper)</td>
<td>480</td>
</tr>
</tbody>
</table>

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed of type H-11 high-temperature alloy steel provide extremely high creep resistance.

---

### Table 1

---

*The table includes screw sizes and the corresponding torque values for lubricated threads.*
## TROUBLESHOOTING GUIDE, continued

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Probable Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Possible internal damages.</td>
<td>Return pump to ITW Dynatec for repair.</td>
<td></td>
</tr>
<tr>
<td>Excessive seal assembly leakage</td>
<td>1. Worn seal plate.</td>
<td>Return pump to ITW Dynatec for repair.</td>
</tr>
<tr>
<td></td>
<td>2. Insufficient inlet pressure.</td>
<td>Increase inlet pressure.</td>
</tr>
<tr>
<td></td>
<td>3. Worn lip seal.*</td>
<td>Replace lip seal.</td>
</tr>
<tr>
<td>Reduced pump efficiency</td>
<td>1. Worn gear(s).</td>
<td>Return pump to ITW Dynatec for repair.</td>
</tr>
<tr>
<td></td>
<td>2. Worn bearings.</td>
<td>Return pump to ITW Dynatec for repair.</td>
</tr>
<tr>
<td></td>
<td>3. Process conditions changed.</td>
<td>Consult factory for clearance recommended on new process conditions.</td>
</tr>
</tbody>
</table>

* A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.
ZENITH MELT SPINNING PUMPS MANUAL

Covers ITW Dynatec part numbers:

- 084E374
- 084E376
- 084E387
- 084E388

Care and Maintenance of Zenith® High Temperature Metering Pumps

Pump PN's 084E374 thru 084E389 use PN 069X251 pump shaft seal.
Pump PN's 084E411 thru 084E413 use PN 069X289 pump shaft seal.
This maintenance manual is as specific as possible, but please remember that there are many varieties of Zenith® pumps in service. If you have any questions about specific parts and their orientation, always refer to the drawings and parts lists for your exact pump by type. If you still have questions, refer them to us at the factory.

1. Introduction

Zenith® “Melt Spinning” Pumps are precision instruments requiring skilled and careful maintenance. Constructed of high quality tool and die steels such as AISI types D-2, M-2, and M-4, or other high performance alloys, they are tempered after heat treatment to hardnesses ranging from Rockwell “C” Scale 58 to 64. A Zenith Pump may be constructed from any one or any combination of these steels since their coefficients of thermal expansion are almost identical.

Zenith Metering Pumps consist of two or more gears housed within center and side plates. Power is transmitted to the gears by the drive shaft which is either a through shaft, as in the packing gland type of pump, or a shaft with a tang that engages a universal seal coupling. The coupling is both a connection to external power and the rotating member of a mechanical seal.

In order to develop the high pressures demanded, the clearance between the metering gears and their housing must be as small as possible, yet large enough to allow adequate lubrication. Because of these close running clearances (in many cases as low .00025"), Zenith Pumps require careful maintenance and handling, especially of component parts. The slightest burr, nick or particle of foreign matter can cause scoring or even seizure.

2. General Operating Requirements

Since Zenith Pumps depend upon metered fluids for lubrication of their internal bearing surfaces, their recommended optimum operating speed range is between 10 and 75 rpm, depending upon viscosity and operating pressures. Increasing their operating speed improves their efficiency but also provides less time to fill the gear tooth spaces.

Cavitation may occur if sufficient inlet pressure is not provided. Cavitation, or the failure to fill the tooth spaces completely, causes low delivery and excessive wear. It also encourages the introduction of air through seals. Under ideal conditions, speeds up to 200 rpm have been maintained over long periods of time. You can, however, expect accelerated wear in such instances, depending on the lubricity of the solution and the differential pressure in the application.

Another cause of low throughput is slippage across the sides of the gears from the high pressure discharge section to the lower pressure inlet section when thin fluids are metered against a substantial differential pressure. This slippage is dependent on three factors: viscosity of the material, speed of the pump and the differential pressure. Therefore, even though the clearance between the gears and their housing may be as little as .00025", high slippage may still occur from high to low pressure ports, if viscosity is low and pressure high.

3. Preparing Your Zenith Pump for Use

Assembly

Assembled with mineral oil. Cleaned with Acetone or MEK.

Since Zenith Pumps are precise instruments, their assembly requires detailed attention to every step.

1. Zenith Pumps are shipped filled with a rust preventative oil. Flush the oil out thoroughly with a cleaning solvent. It may be necessary to disassemble the seal arrangement to remove all traces of the oil, but disassemble only if necessary.

2. After flushing, the pump should be lubricated internally. Pour a suitable high temperature lubricant into the inlet port. Rotate the metering gears until the lubricant appears at the discharge port.

3. Mount the pump to a block with a flatness of true flat to .0001 " convex and a surface finish of 4 to 8 rms to prevent leakage between the pump and the block. Make sure mounting bolts are lubricated (with DAG Dispersion *154, for example) and alternately torqued in even increments up to the manufacturer’s recommended limit for the bolt size used (see Table).

Screw Torque Values* (Standard Alloy Steel)

<table>
<thead>
<tr>
<th>Thread (UNC)</th>
<th>Screw Size &amp; Thread (UNC)</th>
<th>Torque (lb-in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>*10-24</td>
<td>(w/ Carbon Seal Gasket)</td>
<td>50</td>
</tr>
<tr>
<td>*10-24</td>
<td>(w/o Carbon Seal Gasket)</td>
<td>80</td>
</tr>
<tr>
<td>*12-24</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>1/4-20</td>
<td></td>
<td>160</td>
</tr>
<tr>
<td>5/16-18</td>
<td></td>
<td>325</td>
</tr>
<tr>
<td>3/8-16</td>
<td></td>
<td>360</td>
</tr>
<tr>
<td>1/2-13</td>
<td></td>
<td>900</td>
</tr>
</tbody>
</table>

*In critical applications where control of bolt preload is important, the torque-tension relation should be determined by experimenting on the actual parts involved (including thread lubricants). At elevated temperatures, it is often desirable to reduce screw stress because of deformation (creep) under sustained loading. Screws constructed to type H-11 high temperature alloy steel provide extremely high creep resistance.

4. Startup

1. Ensure that the pump is free turning and lubricated.

Engage the outer drive shaft carefully, making sure that it
5. Cleaning

1. To clean melt spinning pumps, place them in a suitable furnace and gradually heat in an inert atmosphere for the initial hour to prevent flashing of the polymer. Time at temperature will be related to pump size and degree of polymer contamination and should be determined by trial.

   NOTE: Careful control of the furnace temperature and atmosphere is critical. Should the temperature exceed the original tempering temperature, the steel hardness may draw back and the dimensional stability of the pump may be upset. Consult Table for proper tempering temperature.

<table>
<thead>
<tr>
<th>AISI Type</th>
<th>Tempered At</th>
<th>Hardness</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-2 (Ohio Air Die)</td>
<td>580°F (305°C)</td>
<td>38-60</td>
</tr>
<tr>
<td>M-2</td>
<td>1050°F (565°C)</td>
<td>61-64</td>
</tr>
<tr>
<td>M-4 (Neatro)</td>
<td>1050°F (565°C)</td>
<td>61-64</td>
</tr>
</tbody>
</table>

   *Another acceptable cleaning method is to immerse the pump in a fluidized bed cleaning bath. The bath should be heated to a temperature that is sufficient to carburize the polymer. The carburization process usually takes between 3-12 hours, depending on the polymer type, temperature, pump size and furnace load.

   CAUTION: Avoid exposing the pump to thermal shock when using this method of cleaning.

2. After gradually cooling to room temperature, the pump should be thoroughly flushed in a clean solvent. Again, it is usually necessary to disassemble only the seal arrangement to remove polymer ash.

3. Always replace the carbon seal plate after pump burnout. If the pump was performing satisfactorily when removed from service and still turns freely after burnout, pressure test it and add a high temperature lubricant to prepare it for return to service.

   *To store for future use, simply add a rust preventative oil.

6. Disassembly

If pumps are to be disassembled on a regular basis, we recommend that you establish a pump room with all the necessary tools and equipment for disassembly and cleaning with a separate "clean" area for assembly, testing and storing of rebuilt pumps.

If maintenance is required due to low delivery or seizure, the following procedure is recommended for disassembly.

NOTE: Be sure to note the location and orientation of all parts to ensure correct reassembly.

1. Remove the seal arrangement.

2. Remove all binder screws.

3. Remove dowels and arbors with an arbor press in the direction which disengages the press fit in the shortest distance.

   NOTE: Most dowels and arbors are press fit in the front side plate and slip fit in the center and rear side plates. When this is the case, it is preferable to press from the front (drive) side. Remove the plates by lightly tapping them with a soft head hammer. Pry slots are available in the pump, you may use them instead of or in conjunction with, the above method. In either case, great care should be taken not to scratch or damage the internal pump surface when prying the plates apart.

4. After disassembly, clean all components in a glass bead blast cabinet to remove any debris remaining after heat cleaning.

5. Wash components in an ultrasonic cleaning tank and air dry.

6. Inspect all parts for nicks, burns, score marks and other signs of wear.

   * The plates and sides of the gears may be hard blocked on 400/600 grit paper and any nicks, burns or sharp edges can be lightly removed with an Arkansas stone.

   CAUTION: Since the thickness relationship between the metering gear and center plate is critical to metering performance, and the center plate is non-wearing on its sides, lapping these components is not necessary and should not be done under any circumstances.

7. To keep maintenance costs to a minimum, the following procedure is recommended.

   A. Measure used parts and compare their dimensions with new part standards. This will provide you with precise information on the wear of the pump parts and aid in maximizing the useful life of each component.

   B. Replace worn gears, shafts, bearings and center plates.

   C. Side and middle plates may be refinished by grinding and/or lapping them to remove wear markings and return them to flatness within .0001" convex and a surface finish of 4 to 8 rms.

   8. Replace the sleeve bearings as necessary and bore in the plate to the original new part specifications.

   9. After each resurfacing, carefully gauge the area between the inlet and discharge ports at the mesh of the gears. This area commonly referred to as the "throat" is the most critical part of the plate. Scoring or wear marks here will allow increased slippage from the high pressure discharge port section across the throat to the lower inlet port reducing efficiency. Therefore, carefully gauge this area for flatness after each resurfacing.
7. Reassembly

NOTE: During and between each reassembly step, manually turn the metering gears to ensure that they are free turning. If binding occurs at any time, determine the cause and correct it immediately. A tiny nick, burr or foreign particle can extensively damage a valuable pump component. Never use force in reassembling or turning a Zenith Pump. If properly aligned, the pieces will fit easily into place and the pump will turn freely.

Reassemble the pump as follows:

1. After all worn parts have been reconditioned or replaced, all parts should be thoroughly cleaned in a solvent and dried.
2. Using the driven gear as an uprighting fixture, carefully locate the arbor over its press fit hole in either the front or rear plate. Smoothly drive the arbor into its hole with the help of an appropriate arbor press.
3. Place the front side plate with the arbor in position in a soft-jaw vise or holding fixture.
4. Slip together the driving metering gear, drive shaft and key. Position in the front of the side plate by installing the drive shaft through the bearing.
5. Place the driven metering gear on its arbor and carefully mesh with the driving metering gear.
6. Carefully lower the center plate over the gears.
7. Position the rear side plate.
8. Rotate the gears to ensure free rotation.
9. Press the dowels into place moving in the direction of the shortest press distance. (Usually from the rear side of the pump.)
10. Lubricate the binder screws with DAG Dispersion #154 or a similar heat resistant lubricant and install. Torque the screws in even increments to the manufacturer's recommended limit. It is especially important to rotate the gears frequently during this operation.
11. Reassemble the seal arrangement, making sure the sealing surfaces are perfectly clean and free of scratches, nicks or burrs. When a carbon seal plate is used, always use a new carbon seal that has been lightly polished on 400/600 grit paper. When using a carbon seal, the coupling housing screws should be torqued to 3/4 the manufacturer's recommended torque limit.
   For pumps equipped with a compression packing seal, be sure all old packing is removed from the packing housing.
12. Inspect the drive shaft at the seal area making sure that it is not scored, Shouldered or worn.
13. Dip the packing rings into high temperature oil and graphite. This aids in assembly and running-in of the packing.
14. Place the first packing over the shaft and force it firmly and evenly to the bottom of the packing housing. Tap it firmly into place.
15. Rotate the drive shaft by hand after each ring is installed to aid in seating the packing. Continue to install the rings in this manner until the proper number of packings have been installed.
16. Firmly compress the packing by alternating and evenly tightening up the gland screws, then back off 1/4 turn. Be sure to adjust the gland evenly.

8. Some Causes of Pump Failure

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
</tr>
</thead>
</table>
| Seizure | a) foreign particle  
          b) mounting block not flat  
          c) uneven heating  
          d) lack of lubrication  
          e) interference fit of moving parts |
| Excessive Slippage (reduced pump efficiency) | a) worn gears: thickness and outside (reduced diameter, corners of teeth not square)  
                                               b) worn center plate  
                                               c) side plates scored at throat  
                                               d) side plates not flat |
| Seal Leakage* | a) worn or scratched coupling or seal plate  
                b) drive shaft bottoming in slot of coupling  
                c) drive shaft misaligned |

* A minor seal leak or weep is not abnormal and may be desirable for lubricating the seal surfaces.

9. Rehabilitation

Pumps may be returned to an authorized repair facility for rehabilitation. All repaired pumps must pass the same strict standards as new ones.

10. Factory Visit

If pumps are to be maintained at your plant, it can be very worthwhile to have key maintenance people spend a day at the Zenith factory to view manufacturing, gauging, and assembly techniques. Please contact us concerning plans for such a visit or with any questions you may have regarding the application or maintenance of your Zenith* "Melt Spinning" Pumps.

Parker Hannifin Corporation  
Zenith Division  
48 Woerd Avenue, Box 9115  
Waltham, MA 02254  
017/854-0050 Telex: 263905

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HIGH ACCURACY PUMP PERFORMANCE

VOLUMETRIC EFFICIENCY %

VOLUMETRIC EFFICIENCY FACTOR

\[ \frac{\Delta P}{\mu N} \]

\( \Delta P \) = DIFFERENTIAL PRESSURE (PSI)
\( \mu \) = APPARENT VISCOSITY (CENTIPOISES)
\( N \) = RPM

Legend:
- 084E387: 0.160 cc/rev
- 084E388: 0.297 cc/rev
- 084E374: 0.584 cc/rev
- 084E376: 1.752 cc/rev
- 084E430: 2.92 cc/rev
- 084E432: 1.168 cc/rev
Pressure Transducer PN 800225 (Model 0101-1.5T-1.5/18)

As with any type of electronic or mechanical instrument, the ISI Melt Pressure Transducer will perform as required if proper attention is given to proven and well-established handling, installation and operational procedures. Checklists are provided and, when followed, will ensure that the transducer will provide the service and performance that are expected of this type of instrument.

Electrical Checklist

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wiring</td>
<td>As shown</td>
</tr>
<tr>
<td>Cable Connection</td>
<td>Use six wire-shielded cables as provided by ISL or equivalent</td>
</tr>
</tbody>
</table>
| Calibration     | With the extruder at operating temperature and no pressure applied to the transducer.  
|                 |   • Adjust the zero control until readout is zero  
|                 |   • Push the calibration button and adjust span (gain) until readout is at 80% of full range. |

Calibration Certificate

- Range: 0-1,500 PSI
- Rcal: 1,200 PSI
- Zero Balance: 0.5% full scale
- Full Scale Sensitivity: 3.320 mv/v
- Excitation Voltage: 10 volts recommended
- 12 volts maximum

INDUSTRIAL SENSORS INCORPORATED
8 Lowell Avenue, Woburn, MA 01801
Telephone: 617-729-5289
Fax: 617-729-1699

Mechanical Mounting Checklist

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective Cap on Sensing Diaphragm</td>
<td>Remove only when ready to install transducer</td>
</tr>
<tr>
<td>Machined Hole (Nut)</td>
<td>Should be as shown</td>
</tr>
<tr>
<td>Transducer Preparation</td>
<td>Lubricate threads with Never-Seez by Bostik or C5A by Felpro</td>
</tr>
<tr>
<td>Transducer Housing</td>
<td>Locate in less than 120°F ambient temp.</td>
</tr>
<tr>
<td>Transducer Installation</td>
<td>Clear mounting hole of plastic residue</td>
</tr>
<tr>
<td>Mounting Torque</td>
<td>550 inch pounds recommended</td>
</tr>
<tr>
<td></td>
<td>500 inch pounds (max)</td>
</tr>
</tbody>
</table>
## Start-up and Removal Checklist

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PROCEDURE</th>
<th>SYMPTOM</th>
<th>TYPICAL CAUSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start-Up</td>
<td>Make sure that the extruder is at the desired temperature before the extruder drive is operated.</td>
<td>Indicator at Full Scale or Unstable indication</td>
<td>An open circuit — Perform continuity checks with ohm meter.</td>
</tr>
<tr>
<td>Removal of Transducer</td>
<td>Always remove the transducer prior to cleaning the extruder barrel and remove only while the extruder is at temperature.</td>
<td>Indicator at zero but use of calibration procedure produces no change in reading</td>
<td>Faulty instrument — Replace and repair or return to SI</td>
</tr>
<tr>
<td>Cleaning of Transducer tip</td>
<td>Wipe the transducer tip with a cloth while the transducer is still hot. Do not use sharp tools on tip.</td>
<td>Indicator responds to calibration procedure but does not indicate pressure</td>
<td>Transducer is damaged — Return to SI</td>
</tr>
</tbody>
</table>

## Installation -
Recommended mounting hole dimensions

### Models 0100, 0101, 0102, 0110, 0111, 0112, 0113

### Models 0100, 0101, 0102, 0120, 0121, 0122

## Wiring Diagrams

### Models 0100, 0101, 0102, 0110, 0111, 0112, 0113

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PN 105729 Electric Clutch

Important
Please read these instructions carefully before installing, operating, or servicing your Stearns clutch brake or clutch-brake. Failure to comply with these instructions could cause injury to personnel and/or damage to property if the brake is installed or operated incorrectly. For definition of limited warranty/liability, contact Rexnord Corporation, Stearns Division, 120 North Broadway, Milwaukee, Wisconsin 53202, (414) 272-1100.

Caution
1. Servicing shall be in compliance with applicable local safety codes including Occupational Safety and Health Act (OSHA). All wiring and electrical connections must comply with the National Electric Code (NEC) and local electrical codes in effect.

2. To prevent an electrical hazard, disconnect power source before working on the clutch, brake or clutch-brake. If power disconnect point is out of sight, lock disconnect in the off position and tag to prevent accidental application of power.

3. Be careful when touching the exterior of an operating unit. Allow sufficient time to cool before disassembly. Surface may be hot enough to be painful or cause injury.

General Description
The CCC-Clutch, Clutch Couplings are designed to be assembled on adjacent shafts. It transmits rotational motion when energized by coupling these shafts together.

Through an electromagnetic force, the drive hub will attract the armature and the driving torque developed between these components effectively couples the shafts together. This torque or power flow is developed whether the driving force is on the driven hub or on the drive hub assembly. Our standard terms are used to help identify the parts for descriptive purposes only.

Installation
The magnet and rotor assembly are mounted on one shaft, normally the drive shaft. Be certain that the key is in place in the keyway and push the assembly on the shaft until the end of the shaft is flush or nearly flush with the counter bore in the rotor face. Do not have shaft extend beyond the counter bore in the rotor face. The splined driven hub with armature is mounted on the adjacent shaft. Maintain the air gap per Table A between the rotor and armature (open magnet armature gap). Proper positioning can be checked by this air gap with the coil de-energized. Setting the initial starting gap near .010 will provide for slightly longer life from the clutch with spring release.

Fasten restraining bracket in a manner that prevents the magnet body from rotating. Caution! Do not overtighten the bracket, as this preload the bearing.

Electrical Connection(s)
The voltage to be applied is determined by the rating shown on the nameplate.

A common way to provide control voltage for a unit is to use a full wave rectifier control. Connection diagrams provided with these rectifiers will depict the proper electrical connections. Due to technical advances in electronics, many rectifier controls with a 115 VAC, 60 Hz input are able to deliver an output of approximately 103 VDC when connected to a coil. This is not harmful to a 90-100 VDC rated coil in a clutch or brake.

For Stearns Tor-ac* units, the leads provided by the Tor-ac module should be connected to a fused relay or switching control source of 105 to 125 VAC, 50-60 Hz. See Figure B for a typical wiring connection of Tor-ac controlled units.

Table A

<table>
<thead>
<tr>
<th>Size</th>
<th>Hub-Rotor Gap (reference) (inches)</th>
<th>Open Magnet-Armature Gap (inches)</th>
<th>Maximum Allowed Misalignment (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parallel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Angular</td>
</tr>
<tr>
<td>3</td>
<td>1/32</td>
<td>.010 to .030</td>
<td>.005</td>
</tr>
<tr>
<td>3.5</td>
<td>1/16</td>
<td>.010 to .030</td>
<td>.005</td>
</tr>
<tr>
<td>5</td>
<td>3/32</td>
<td>.010 to .030</td>
<td>.005</td>
</tr>
<tr>
<td>5.5</td>
<td>1/16</td>
<td>.010 to .030</td>
<td>.005</td>
</tr>
<tr>
<td>8</td>
<td>1/8</td>
<td>.010 to .030</td>
<td>.025</td>
</tr>
</tbody>
</table>

Figure A

Figure B

On units with cord grips do not remove cap or turn hex portion of fitting. Wires may be twisted and torn off if attempted.

Enclosure
Normally, the machine housing provides sufficient enclosure. Care must be taken to protect unit from grease, oil or airborne materials. Slippage and excess heating of the unit may result if proper protection is not provided.

Care should be taken that high ambient temperatures do not exist. Provide proper ventilation and cooling.

Burning
Full torque of a new unit will not develop until the mating friction surfaces have been burnished or run-in. Burning can be accomplished by cycling the clutch-brake under normal operating conditions. Burning may also be accomplished by slipping under load at reduced voltage for short periods of time. Consult factory for additional burning instructions. If normal cycling does not provide for sufficient burning in your application, be prepared to discuss specifics, such as horsepower, rpm, position and environment when talking to factory personnel.

Component Descriptions
After proper installation, no further adjustment should be required for the life of the unit.
PN 105729 Electric Clutch

Rotor or drive hub
The rotor is constructed to be mounted and keyed to a rotating shaft and held in place with set screws or other means of fastening. An outer pole and inner pole are separated by friction material. A ball bearing is mounted on the rotor shaft for the purpose of providing support to the magnet and maintaining proper air gaps on this assembly.

Driven hub
The driven hub is to be mounted to a separate shaft. It is to be keyed and held in place with set screws or other means of fastening. A spline on the outside diameter of this hub on which the clutch armature is to be assembled. A retaining ring is normally placed on the hub to act as a stop for the armature to prevent an excessive air gap between the armature and rotor face.

Armature
The armature has splines on its inside diameter which mate with splines on the driven hub. The armature is spaced on the driven hub so it can move laterally on the splines between the retaining ring stop and the face of the drive hub or rotor.

Rotor and armature faces
Normally, the wear rate will be the same on both surfaces. It is recommended that both elements be changed at the same time. Due to the metal-to-metal contact of rotor and armature, grooves will occur in armature face during normal service life.

Reparis
When the wear between the armature and friction face of the rotor exceeds 3/32", or at the time the clutch fails to engage, the following parts are to be replaced:

Armature
Rotor assembly
Other parts which are to be replaced when they become worn or malfunction:
Ball bearings
Magnet and coil assembly
Splined driven hub

Troubleshooting for Industrial Type Clutches
Note: If DC voltage is measured without the coil being connected, a misleadingly high reading results due to a capacitor in the arc suppression network used with the rectifier.

A. Overheating, coil-burned-out or loss of torque
2. Check thermal capacity of unit versus actual heat dissipation requirements. See Catalog 500 for specifications.
3. Check voltage supply as close to coil as feasible. Compare to nameplate data, if incorrect apply proper voltage.
   For Tor-ac units, check voltage supply as close to the Tor-ac module as possible. If this value is not between 105-125 VAC (if variable voltage input is not being used), correct the voltage source and replace burnt-out parts.
4. Is coil resistance correct? Resistance of the 90 VDC coils and Tor-ac coils are tabulated in Table B. For others, contact factory.

Table B
<table>
<thead>
<tr>
<th>Size/Style</th>
<th>90-100 VDC and 115 VAC Tor-ac Coil Resistances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ohms (nominal value)</td>
</tr>
<tr>
<td>3/CCC-30</td>
<td>904</td>
</tr>
<tr>
<td>3.5/CCC-35</td>
<td>869</td>
</tr>
<tr>
<td>5/CCC-50</td>
<td>459</td>
</tr>
<tr>
<td>5.5/CCC-55</td>
<td>316</td>
</tr>
<tr>
<td>8/CCC-80</td>
<td>232</td>
</tr>
</tbody>
</table>

5. Start time on clutches normally should not exceed one second. If excessive, recheck torque rating versus load characteristics.
6. On release springs, check for broken, missing or substituted springs not of our manufacture.
7. Check for oil/grease on friction elements. If this is found, replacement is recommended of complete unit or affected elements.
8. Are control (limit) switches operating properly and set in proper place? A switch malfunction may appear to be loss of torque.
9. Is unit fully furnished? If not, see Furnishing Instructions.
10. Check that the restraining bracket is properly secured. See Step 3 of Installation.
11. During the life of the unit, friction material and metal dusts accumulate due to normal cycling. This dust may be removed by vacuuming or brushing. Removal of accumulated dusts and dirt will prolong the unit life.

B. Fuse in power supply blows
1. Never put in a higher rating fuse or replace with a slo-blow type.
2. Check resistance of coil, if shorted, replace magnet body and coil assembly. If not shorted, obtain actual coil resistance and compare to reading in Table B, or value obtained from factory.
Check for grounded lead wire(s) between unit and fuse. If grounded, correct problem. In above, correct problem before installing a new fuse.
3. If cause was not found in Step 2 above:
   a) Check Tor-ac module by removing all loads and replacing fuse. If fuse blows when AC is applied to Tor-ac module, module is defective. Replace.
   b) If cause was not found in Step 2 above, check rectifier bridge by removing all loads and replacing fuse. If fuse blows when AC is applied to rectifier, bridge is shorted. Replace bridge if feasible or discard control and replace.

C. Unit fails to engage
1. See Items under A, this Section.
2. Check armature for free movement of the pins in hub or pulley.
3. Check voltage output from Tor-ac or rectifier control when applying 115 VAC, should be approximately 103 VDC with coil connected. Replace Tor-ac module or rectifier control if it is defective.

effective 7/6/94
Optional Memory Card Reader

The following important instructions pertain to the controller’s optional Memory Card Reader. For instructions on installation of the memory card, see Chapter 3: Installation & Start-Up.

CAUTIONS:
1. When not in use, keep the card in its protective case.
2. Keep the card away from high temperatures and direct sunlight.
3. Do not bend the card or subject it to strong shocks.
4. Keep the card dry at all times.
5. Avoid direct contact with the connector terminal of the card.
6. Keep the card away from fire.

Write Protect Function
The Memory Card has a write protect function. The write protect switch is set to OFF when it is shipped from the factory, in order to allow data writing. When the write protect switch is set to the “WP” arrow, protection is ON and it will not allow data to be written.

Initial Installation of the Lithium Battery
The Memory Card’s battery is installed at the factory prior to shipment.

To Replace the Lithium Battery

CAUTION: When replacing the battery, the Memory Card MUST BE INSERTED INTO ITS SLOT ON THE CONTROL PANEL SO THAT YOUR CONTROLLER DATA IS RETAINED.
1. Insert the Memory Card into its slot on the control panel.
2. With your finger, pull the hook downward and remove the battery cover.
3. Remove the old battery.
4. Confirm the position of the new battery’s polarity, as shown in the illustration, and insert the battery.
5. Replace the battery cover.

Replacement Battery
The lithium battery may be obtained locally. Specify CR 2330.