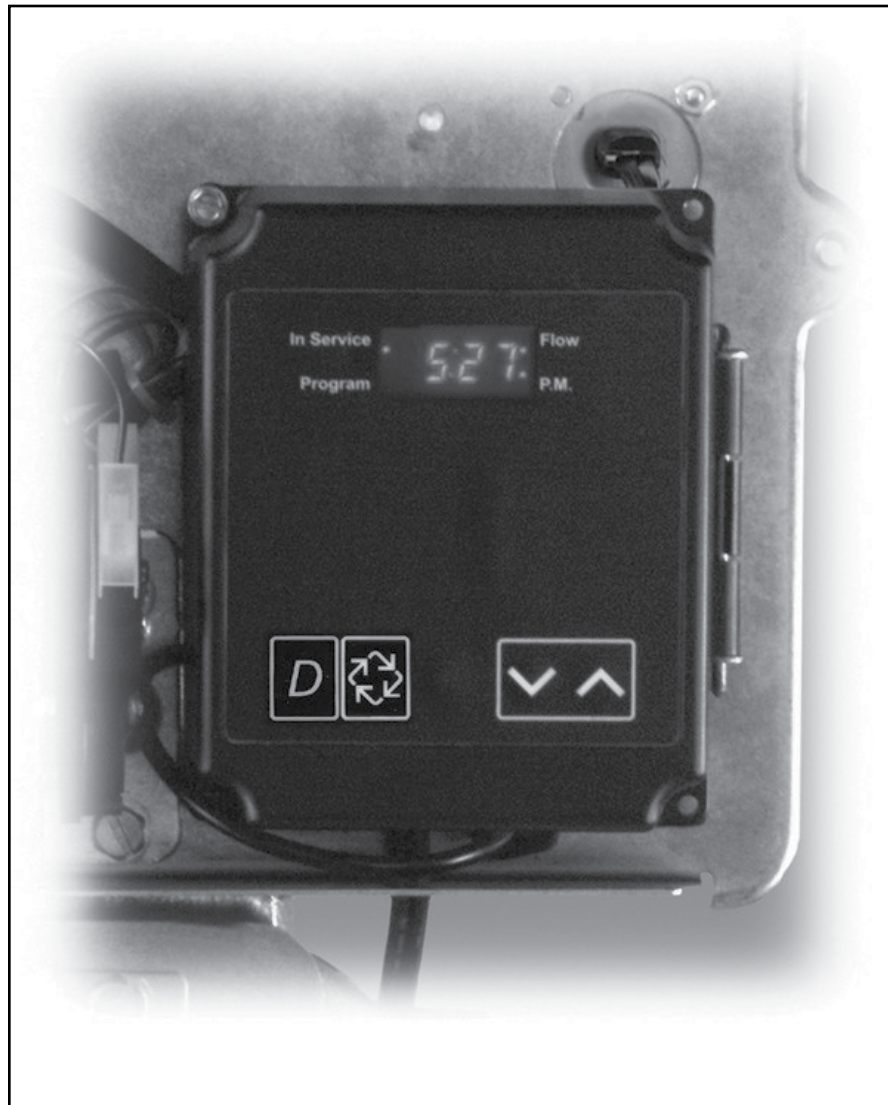


# 3200NT

## *Service Manual*



**IMPORTANT:** Fill in Pertinent Information on Page 3 for Future Reference

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## IMPORTANT PLEASE READ:

- The information, specifications and illustrations in this manual are based on the latest information available at the time of printing. The manufacturer reserves the right to make changes at any time without notice.
- This manual is intended as a guide for service of the valve only. System installation requires information from a number of suppliers not known at the time of manufacture. This product should be installed by a plumbing professional.
- This unit is designed to be installed on potable water systems only.
- This product must be installed in compliance with all state and municipal plumbing and electrical codes. Permits may be required at the time of installation.
- If daytime operating pressure exceeds 80 psi, nighttime pressures may exceed pressure limits. A pressure reducing valve must be installed.
- Do not install the unit where temperatures may drop below 32°F (0°C) or above 125°F (52°C).
- Do not place the unit in direct sunlight. Black units will absorb radiant heat increasing internal temperatures.
- Do not strike the valve or any of the components.
- Warranty of this product extends to manufacturing defects. Misapplication of this product may result in failure to properly condition water, or damage to product.
- A prefilter should be used on installations in which free solids are present.
- In some applications local municipalities treat water with Chloramines. High Chloramine levels may damage valve components.
- Correct and constant voltage must be supplied to the control valve to maintain proper function.

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## Job Specification Sheet

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**Please Circle and/or Fill in the Appropriate Data for Future Reference:**

**Programming Mode:**

Feed Water Hardness: \_\_\_\_\_ Grains per Gallon or Degrees  
Regeneration Time: Delayed \_\_\_\_\_ AM/PM or Immediate  
Regeneration Day Override: Off or Every \_\_\_\_\_ Days

**Master Programming Mode:**

**Valve Type:** 2750 / 2850 / 2900s / 3150 / 3900  
Regenerant Flow: Downflow Upflow Brine Draw First Upflow Brine Fill First  
System Type: 4 Time Clock / 4 Meter Immediate / 4 Meter Delayed  
5 Interlock / 6 Series / 7 Alternating / 9 Alternating  
Valve Position: LEAd or LAg  
Remote System Start: Off or On Signal Time needed \_\_\_\_\_ minutes  
Display Format: US Gallons or m3  
Unit Capacity: \_\_\_\_\_ Grains or Degrees  
Capacity Safety Factor: Zero or \_\_\_\_\_ %  
Regeneration Cycle Step #1: \_\_\_\_\_ Minutes  
Regeneration Cycle Step #2: Off or \_\_\_\_\_ Minutes  
Regeneration Cycle Step #3: Off or \_\_\_\_\_ Minutes  
Regeneration Cycle Step #4: Off or \_\_\_\_\_ Minutes  
Regeneration Cycle Step #5: Off or \_\_\_\_\_ Minutes  
  
Timed Auxiliary Relay Output  
Window #1: Off or \_\_\_\_\_ Start Time  
\_\_\_\_\_ End Time  
  
Timed Auxiliary Relay Output  
Window #2: Off or \_\_\_\_\_ Volume  
\_\_\_\_\_ Seconds  
  
Fleck® Flow Meter Size: 1" / 1.25" / 1.5" / 2" / 3" or Non Fleck® \_\_\_\_\_ Pulses  
Line Frequency: 50 Hz or 60 Hz

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# Timer Operation

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## Set Time of Day

When the timer is In Service, push either the Set Up or Set Down button once to adjust the Time of Day by one digit. Push and hold to adjust by several digits.

## Manually Initiating a Regeneration

1. When timer is In Service, press the Extra Cycle button for 5 seconds to force a manual regeneration.
2. The timer reaches Regeneration Cycle Step #1.
3. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #2 (if active).
4. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #3 (if active).
5. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #4 (if active).
6. Press the Extra Cycle button once to advance valve to Regeneration Cycle Step #5 (if active).
7. Press the Extra Cycle button once more to advance the valve back to In Service

## Timer Operation During Regeneration

In the Regeneration Cycle step display, the timer shows the current regeneration step number the valve is advancing to, or has reached, and the time remaining in that step. The step number that displays flashes until the valve completes driving to this regeneration step position. Once all regeneration steps are complete the timer returns to In Service and resumes normal operation.

Example:



Less than 10 Minutes Remaining in Regen Step #1



Press the Extra Cycle button during a Regeneration Cycle to immediately advance the valve to the next cycle step position and resume normal step timing.

## Start a Regeneration Tonight

With metered delayed timers, press the Extra Cycle button momentarily. The In Service indicator dot flashes and starts a Regeneration tonight at the programmed Regeneration Time.

## Day Regeneration Timer

During normal operation the Time of Day display is visible at all times. The timer operates normally until the number of days since the last regeneration reaches the Regeneration Day Override setting. Once this occurs, a regeneration cycle is initiated at the preset Regeneration Time.

## Flow Meter Equipped Timer

During normal operation the Time of Day display alternates with the Volume Remaining display (gallons or m3).

- As treated water is used, the Volume Remaining display counts down from the calculated system capacity to zero or (---). When this occurs a Regeneration Cycle begins or delays to the set Regeneration Time.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

### Immediate Regeneration Timer with Regeneration Day Override Set

When the valve reaches the set Days Since Regeneration Override value, a Regeneration Cycle initiates immediately. This occurs even if the Volume Remaining display has not reached zero.

### Delayed Regeneration Timer with Regeneration Day Override Set

When the timer reaches the set Days Since Regeneration Override value a Regeneration Cycle initiates at the preset Regeneration Time. This occurs even if the Volume Remaining display has not reached zero.

### Timer Operation During Programming

The timer only enters the Program Mode with the timer In Service. While in the Program Mode the timer continues to operate normally monitoring water usage and keeping all displays up to date. Timer programming is stored in memory permanently. There is no need for battery backup power.

### Timer Operation During A Power Failure

During a power failure all timer displays and programming are stored for use upon power re-application. The timer retains all values, without loss. The timer is fully inoperative and any calls for regeneration are delayed. The timer, upon power re-application, resumes normal operation from the point that it was interrupted.

**NOTE: An inaccurate Time of Day display may indicate a power outage**

### Remote Lockout

The timer does not allow the unit/system to go into Regeneration until the Regeneration Lockout Input signal to the unit/system is cleared. This requires a contact closure to activate. The recommended gauge wire is 20 with a maximum length of 500 feet. See P4 remote inputs in the wiring diagrams on pages 16 - 20.

### Remote Signal Start Regeneration

The control valve monitors treated water other than a flow meter. When timer receives a contact closure for the programmed amount of time, regeneration begins. The recommended gauge wire is 20 with a maximum length of 500 feet. See P4 remote inputs in the wiring diagrams on pages 16 - 20.

### Day Override Feature

If the Day Override option is turned on and the valve reaches the set Regeneration Day Override value without the water meter initiating a Regeneration Cycle, a Regeneration Cycle queues. This occurs regardless of the remaining volume available.



#### **WARNING**

**Transformer must be grounded and ground wire must be terminated to the back plate where grounding label is located before installation.**

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# Timer Operation

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## System 4

### Time Clock (1 Valve)

During normal operation the Time of Day display may be viewed at all times. The control operates normally until the number of days since the last regeneration reaches the Regeneration Day Override setting. Once this occurs, a Regeneration Cycle initiates at the preset Regeneration Time.

### Meter Delayed (1 Valve)

During normal operation the Time of Day display alternates with the Volume Remaining display (gallons or m3).

- As treated water is used, the Volume Remaining display counts down from the calculated system capacity.
- The system monitors the volume of water used. When the system calculates that there is not a sufficient capacity for the next day's operation, a regeneration cycle is initiated at the preset regeneration time.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

### Meter Immediate (1 Valve)

During normal operation the Time of Day display alternates with the Volume Remaining display (gallons or m3).

- As treated water is used, the Volume Remaining display counts down from the calculated system capacity to zero or (----). When this occurs a Regeneration Cycle is started.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

## System 5

### Interlock (2 – 4 Valves)

During normal operation the Time of Day display alternates with the Volume Remaining display (gallons or m3).

- As treated water is used, the Volume Remaining display counts down from the calculated system capacity to zero or (----). When this occurs a Regeneration Cycle queues.
- If no other valve is in Regeneration the valve sends a lock command and starts a Regeneration Cycle.
- If another valve is in Regeneration (i.e. the system is already locked) the valve remains In Service with Regeneration queued until other valves complete Regeneration. Then the system locks and Regeneration begins.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

## System 6

### Series (2 – 4 Valves)

During normal operation the Time of Day display alternates with the Volume Remaining display (gallons or m3). The Volume Remaining is the total volume for all units in the system.

- As treated water is used, the Volume Remaining display counts down from the calculated system capacity to zero or (----). When this occurs a Regeneration Cycle queues.
- If no other valve is in regeneration the lead valve sends a lock command and starts a Regeneration Cycle.
- When the LEAd valve completes regeneration cycle the remaining valve(s) in the system regenerate sequentially until all valves regenerate.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.
- LAG valve volume remaining is updated every 5 seconds from the LEAd valve.
- A manually forced regeneration (EC key) can only be done on the LEAd valve and only if the system is not in Regeneration.

### System 7

#### Alternating (2 Valves)

During normal operation the Time of Day display alternates with the Volume Remaining display (gallons or m3). The Volume Remaining is for the individual unit.

- As treated water is used, the Volume Remaining display counts down from the calculated capacity to zero or (----). When this occurs a Regeneration Cycle queues.
- The valve requiring Regeneration sends a lock command to the standby valve. The standby valve goes to In Service and exhausted valve starts a Regeneration Cycle.
- If a valve is in Regeneration and the other valve exhausts its volume remaining, then the exhausted valve remains In Service with Regeneration queued until the other valve goes into standby. The exhausted valve goes into standby after completing Regeneration.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

### System 9

#### Alternating (2 – 4 Valves)

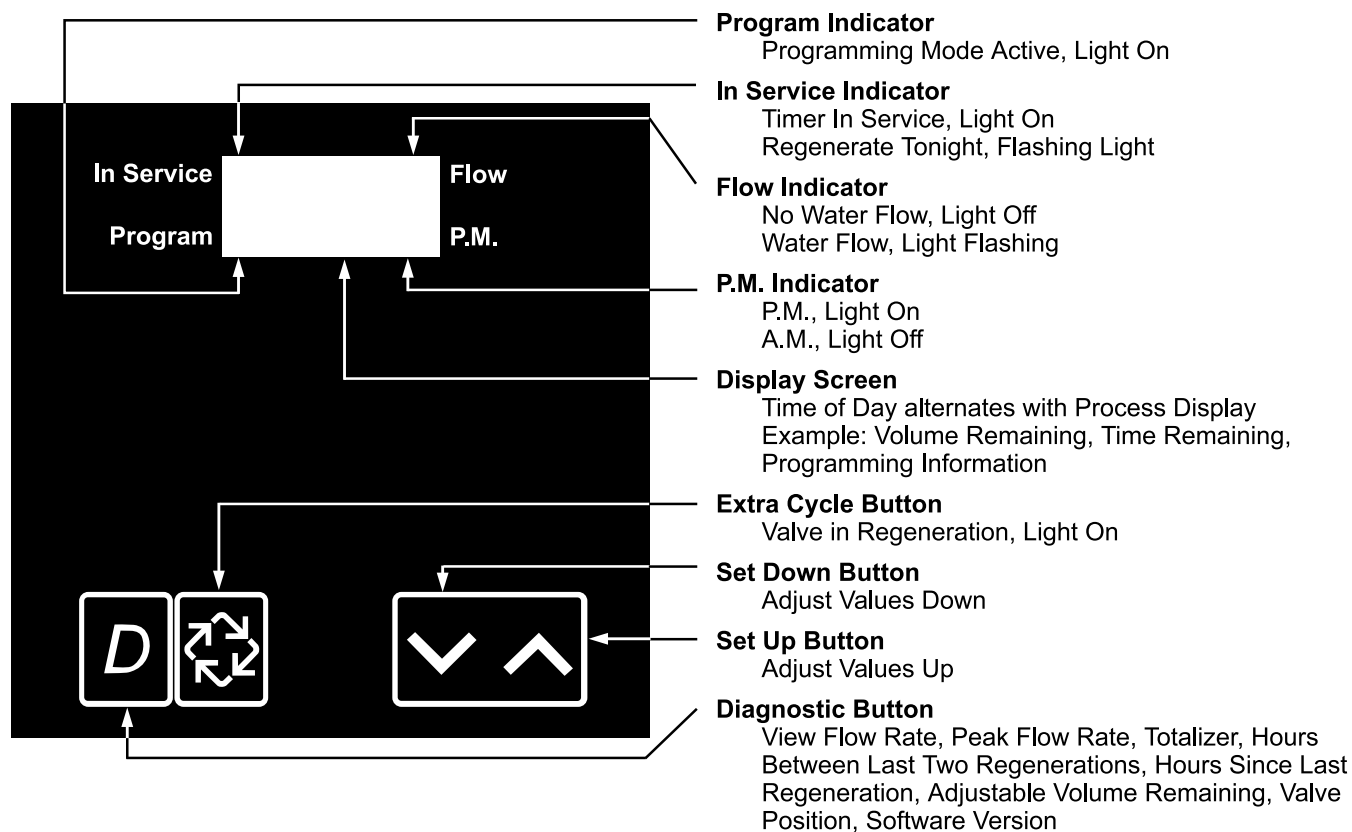
During normal operation the Time of Day display alternates with the Volume Remaining display (gallons or m3). The Volume Remaining is for the individual unit.

- As treated water is used, the Volume Remaining display counts down from the calculated capacity to zero or (----). When this occurs a Regeneration Cycle queues.
- The valve requiring Regeneration sends a lock command to the standby valve. The standby valve goes to In Service and exhausted valve starts a Regeneration Cycle.
- If a valve is in Regeneration and another valve exhausts its volume remaining, then the exhausted valve remains In Service with Regeneration queued until the other valve goes into standby. The exhausted valve goes into standby after completing Regeneration.
- All units remain In Service except those in standby or Regeneration.
- Water flow through the valve is indicated by the Flow Dot that flashes in a direct relationship to flow rate.

### Important System Operations Tips

- When programming multi-unit systems, program LAg units first and then LEAd unit. This eliminates or minimizes program and communication errors.
- When changing a valve from one system type to another system type, perform a Master Reset first.
- System 6, 7 and 9 valves coming out of program mode or on power-up calculate their volume (display = CALc) and then wait for a good communication signal.
  - When a good communication signal is received, the system resume normal operations.
  - If the system does not receive a good communication signal, CALc displays and the system goes into a wait. Press the EC key to force the system out of the wait and resume normal operation. A communication error may appear after one minute.
- The System 4, 5 and 6 LEAd valve drive sequence going into Regeneration is:
  - The lower drive moves to off-line and the upper drive moves to first Regeneration position.
- All system 7 and 9 valves:
  - The off-line valve moves to online, the valve requiring Regeneration moves its lower drive to off-line and then the upper drive moves to first Regeneration position.
- Reserve capacity—System 4Fd only. After power-up or Master Reset, the reserve is set by using the safety factor. Reserve is limited to a range of 0% - 50% of the unit capacity.
- System 6 and 7, LEAd units only, respond to remote lock and chemical pump. Also chemical pump is available only if the auxiliary relay in regeneration is not used [AroF]

# Timer Operation



## 1. Enter 3200NT Programming Mode

Press and hold both the Set Up and Set Down buttons for five (5) seconds to enter Programming Mode. When the program mode is entered, the program light illuminates.



## 2. Set Feed Water Hardness

The feed water hardness setting displays only if the Regeneration Type is set to Meter Immediate or Meter Delayed.

- Press the Set Up and Set Down buttons to set the amount of feed water hardness (in grains/gallon). The system automatically calculates treated water capacity based on the feed water hardness and the system capacity.
- Press the Extra Cycle button to proceed to the next step.





### 3. Set Regeneration Time

A non-flashing colon between two sets of numbers identifies the Regeneration Time display. Set the desired time of day that you want Regeneration to occur.

- Press the Set Up and Set Down buttons to adjust this value.
- Press the Extra Cycle button to proceed to the next step.



### 4. Set Regeneration Day Override

Use this display to set the maximum amount of time (in days) the unit can be In Service without a Regeneration.

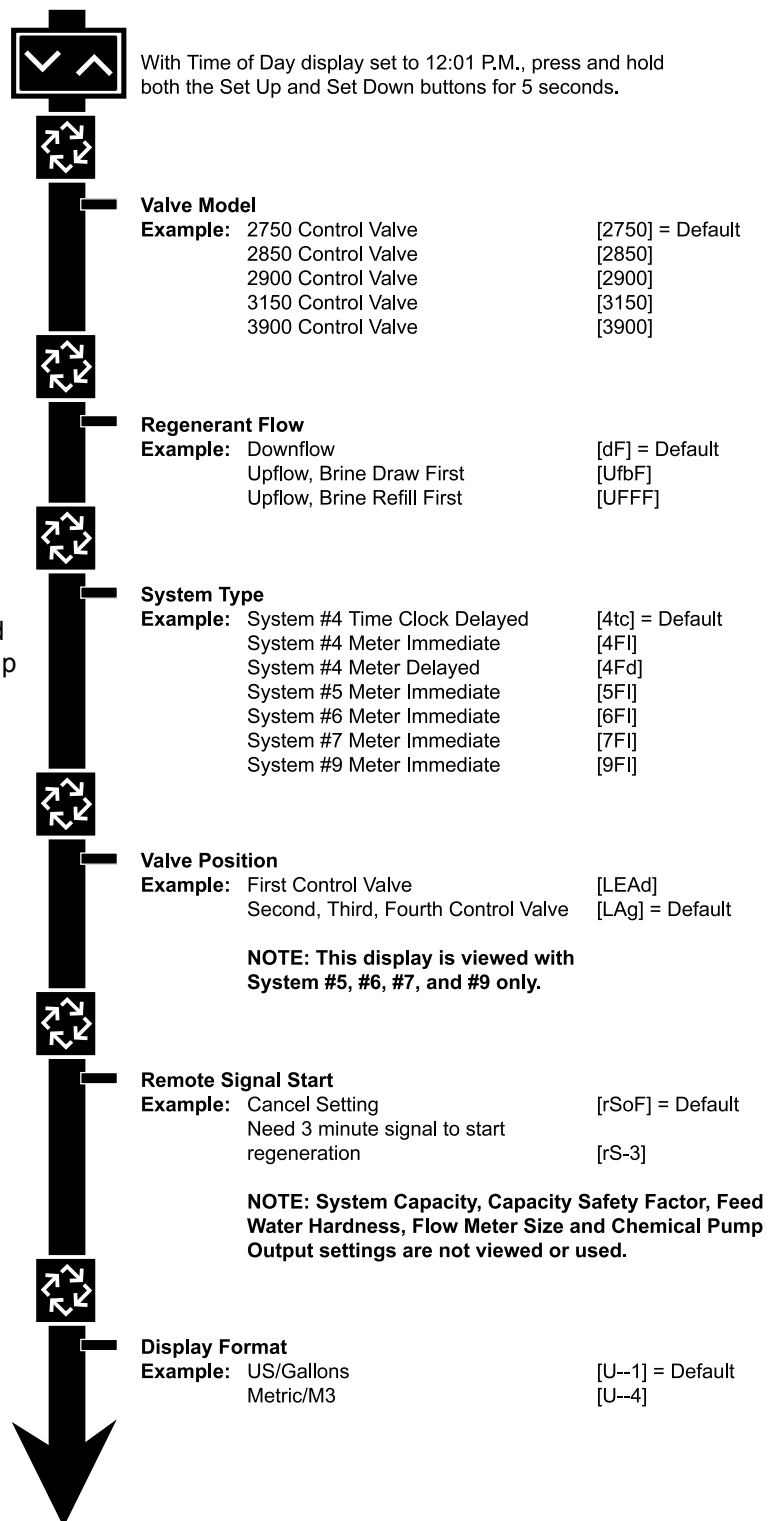
- For System 4 Time Clock regeneration mode the system regenerates at the time set in Step 4 after the number of days programmed in this step.
- For all other System Types (4 Meter Immediate, 4 Meter Delayed, 5, 6, 7, 9) the system regenerates after the number of days programmed in this step unless the meter initiates a Regeneration cycle earlier.
- Press the Extra Cycle button to proceed to the next step.

Timer programming is complete and exits from the Programming Mode. Normal operation resumes.

# Master Programming Mode Flow Chart

## NOTE:

1. Set Time of Day Display to 12:01 P.M.
2. Press and hold both the Set Up and Set Down buttons for 5 seconds.
3. Press the Extra Cycle button once per display until all displays are viewed and Normal Display is resumed.
4. Option setting displays may be changed as required by pressing either the Set Up or Set Down button.
5. Depending on current valve programming, certain displays may not be viewed or set.

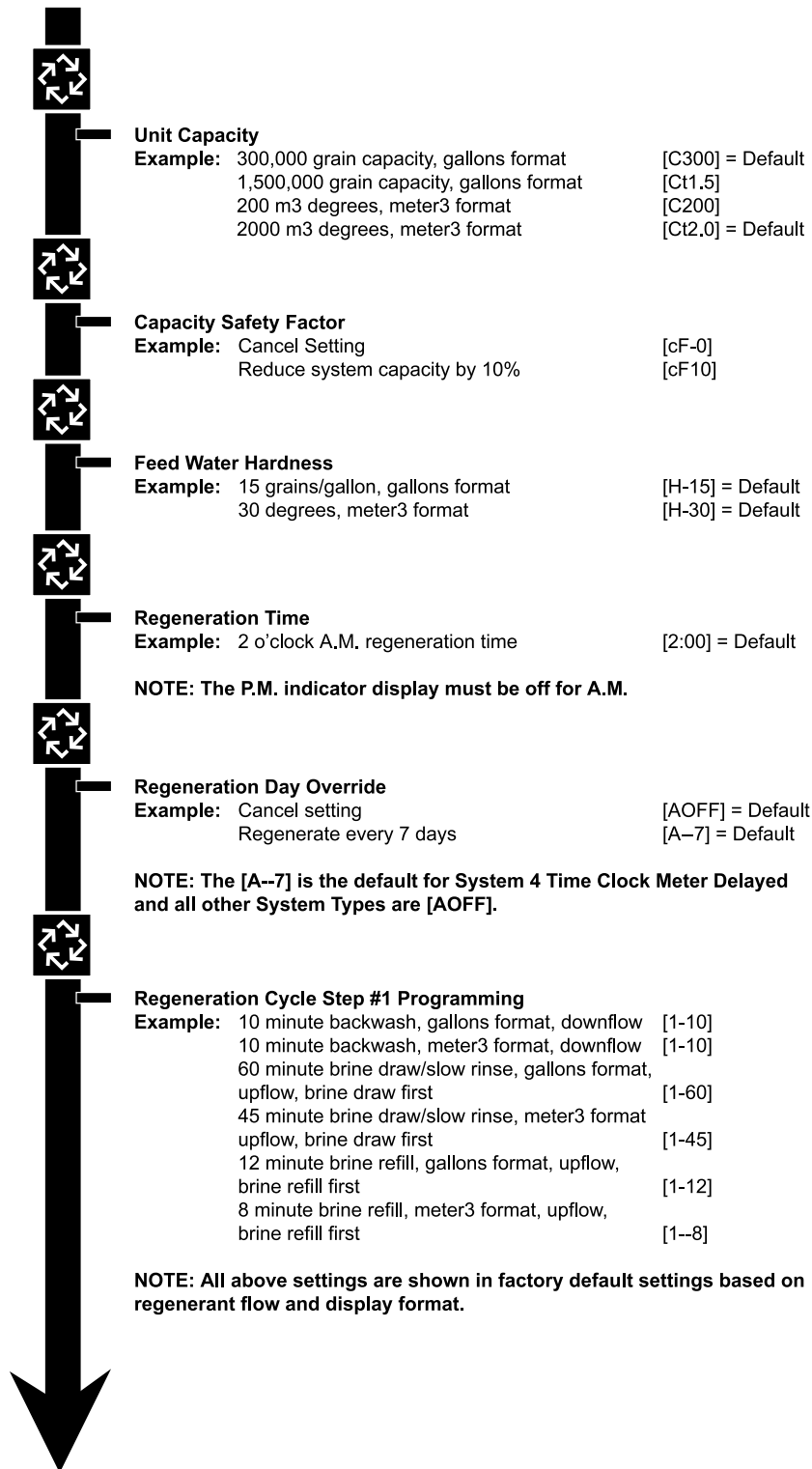


**CAUTION: Before entering Master Programming, please contact your local professional water dealer.**

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# Master Programming Mode Flow Chart

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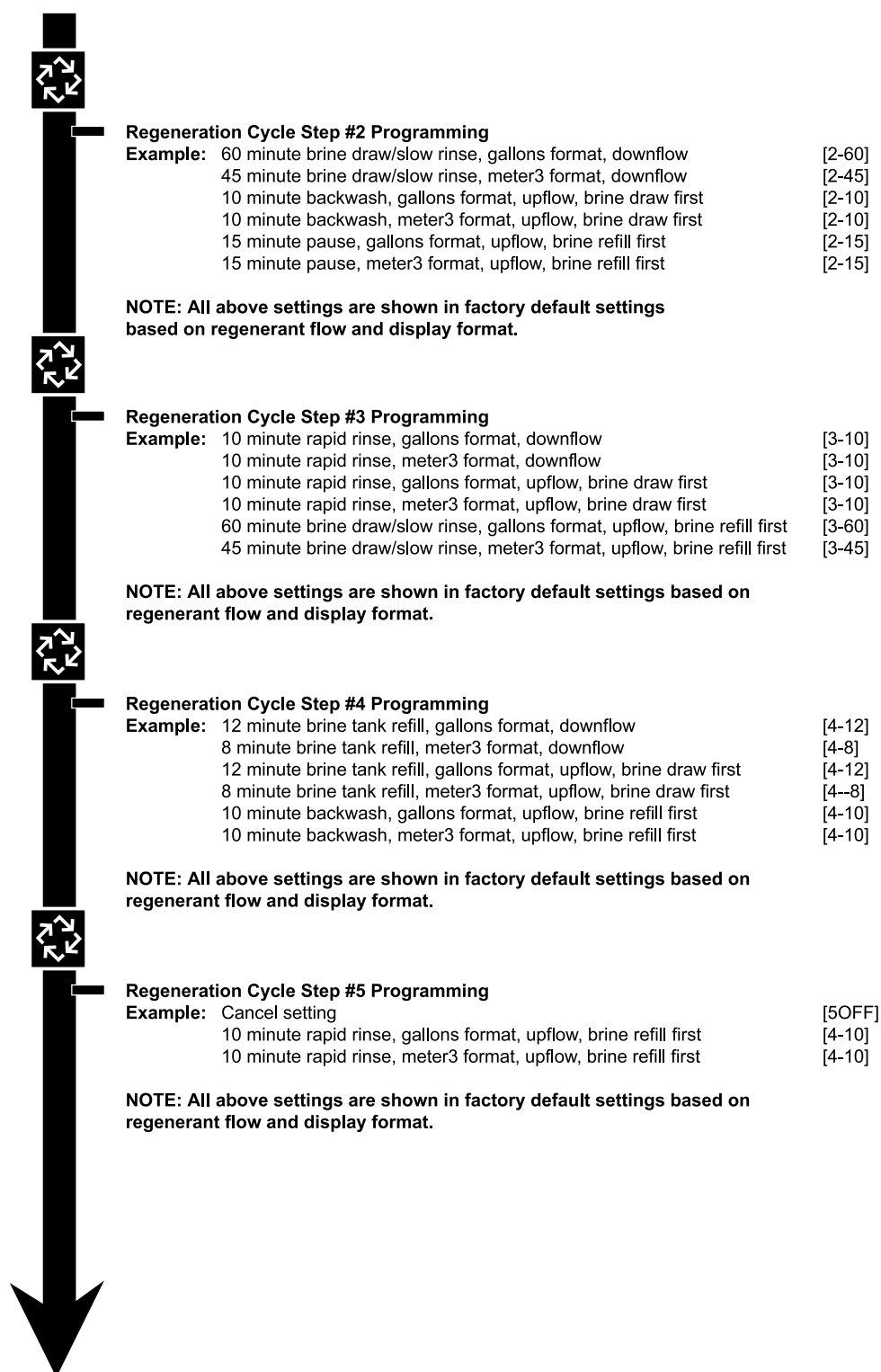


**CAUTION:** Before entering Master Programming, please contact your local professional water dealer.

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# Master Programming Mode Flow Chart

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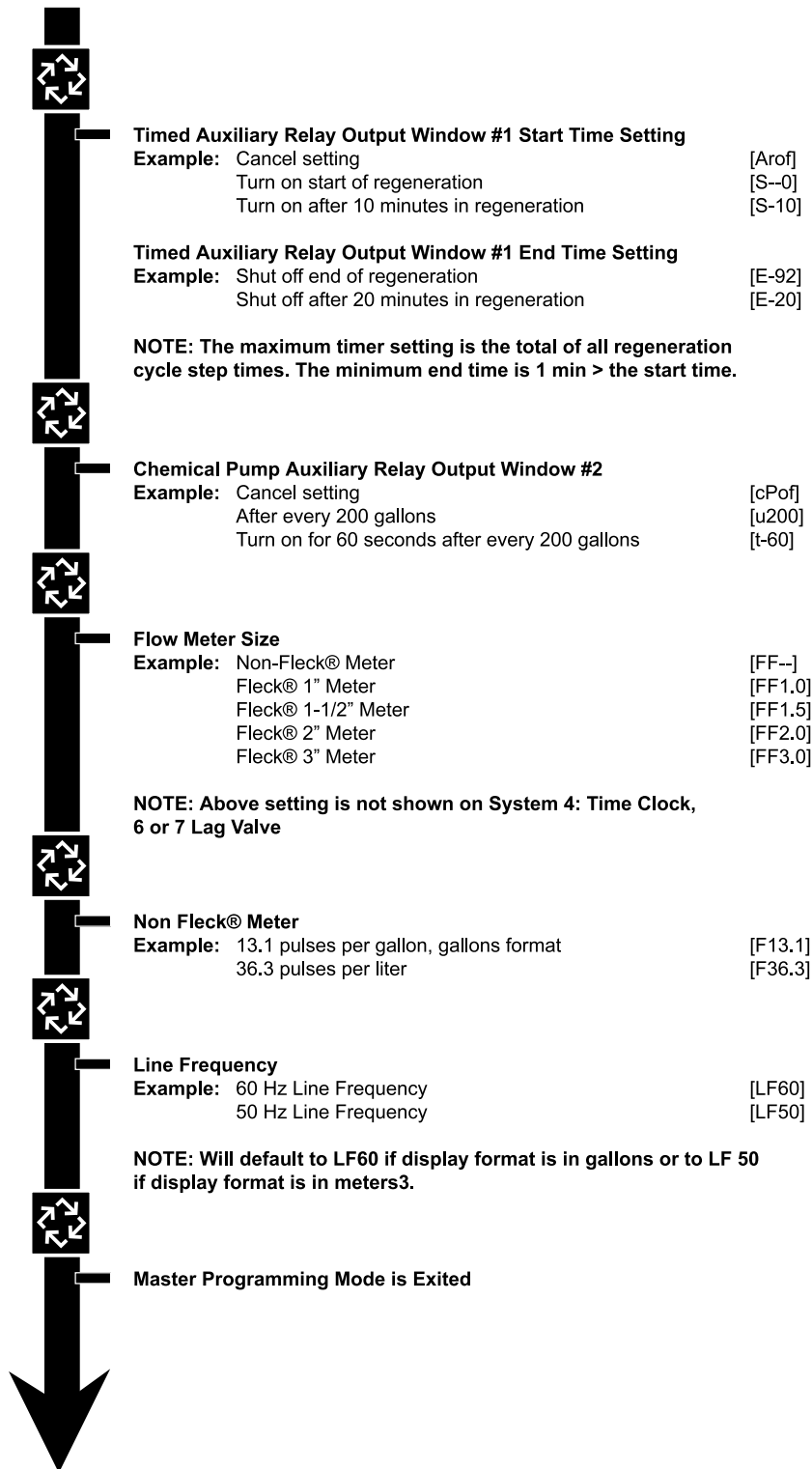


**CAUTION: Before entering Master Programming, please contact your local professional water dealer.**

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# Master Programming Mode Flow Chart

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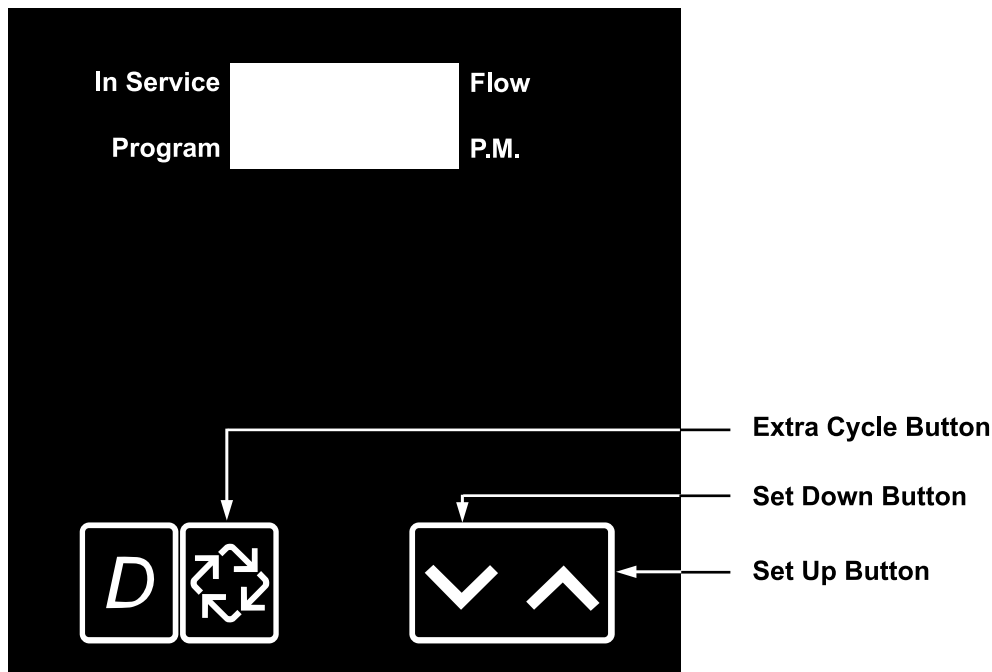


**CAUTION: Before entering Master Programming, please contact your local professional water dealer.**

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## Master Programming Mode

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When the Master Programming Mode is entered, all available option setting displays may be viewed and set as needed. Depending on current option settings, some displays cannot be viewed or set.

### Entering Master Programming Mode

Set the Time Of Day display to 12:01 P.M. Press and hold the Set Up and Set Down buttons together until the Program indicator turns on (about 5 seconds). Depending on current option settings, some displays cannot be viewed or set.

### Exiting Master Programming Mode

Press the Extra Cycle button once per display until all are viewed. The Program Mode is exited and normal display resumes.

### Resetting Permanent Programming Memory

Press and hold the Set Up and Set Down buttons (for about 25 seconds) until the Time Of Day display resets to 12:00 P.M. All option settings reset to default values. Control programming must be reset as necessary.

#### 1. Valve Model (No Display Code)

This program step selects valve models: 2750, 2850, 2900, 3150, and 3900

- Use Set Up or Set Down buttons to adjust this value.
- Press the Extra Cycle button.

#### 2. Regenerant Flow (No Display Code)

This program step is used to set the Regeneration Type. Availability is dependent on valve model chosen.

Downflow Setting: [ dF ]

Upflow, Brine First Setting: [ UFbF ]

Upflow, Fill First Setting: [ UFFF ]

- Use Set Up or Set Down buttons to adjust this value.
- Press the Extra Cycle button.

**CAUTION:** Before entering Master Programming, please contact your local professional water dealer.

### 3. System Type

Use this program step to set the System Type. Possible settings are:

#### **System Type 4 Time Clock Delayed**

**Setting: [ 4tc ]**

The control regenerates on the days set in Regeneration Day Override, at the Regeneration Time set in Regeneration Time.

#### **System Type 4 Meter Immediate**

**Setting: [ 4FI ]**

The control regenerates immediately when the available volume of treated water drops to zero.

#### **System Type 4 Meter Delayed**

**Setting: [ 4Fd ]**

The control regenerates on the day the available volume of treated water drops to less than the reserve volume. Regeneration starts at the Regeneration Time.

#### **System Type 5 Meter Immediate (Interlock)**

**Setting: [ 5 FI ]**

This is a 2 to 4 unit system, each unit having a meter, and all in service. Only one unit is allowed in regeneration at a time. A unit regenerates immediately when the available volume of treated water drops to zero (0) and no other unit is in regeneration.

#### **System Type 6 Meter Immediate (Series) Setting: [ 6 FI ]**

This is a 2 to 4 unit system, all in service, with one meter for the entire system. When the entire system volume of treated water drops to zero (0), it requests the first unit to go into regeneration. Then, when the first unit is done regenerating, the second follows, and so on.

#### **System Type 7 Meter Immediate (Alternating) Setting: [ 7 FI ]**

This is a 2 unit system, with only one unit having a meter and only one unit in service. When the volume of treated water drops to zero (0) in the unit in service, it requests regeneration. This causes the unit in standby to move to service. Then the unit requesting regeneration moves to standby and begins regeneration.

#### **System Type 9 Meter Immediate (Alternating) Setting: [ 9 FI ]**

This is a 3 or 4 unit system, each unit having a meter, one unit in standby and all other units in service. Only one unit is allowed in regeneration at a time. When the volume of treated water drops to zero in the unit in service, it requests regeneration. This causes the unit in standby to move to service. Then the unit requesting regeneration moves to standby and begins regeneration.

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

### 4. Valve Position (No Display Code)

This program step is for two or more control valves in a system. Enter Lead on the first Control valve in a system and the remaining enter Lag. For systems that use 1 meter, the flow meter cable must be connected to the lead control valve. This program step is skipped for System Types 4tc, 4FI and 4Fd.

First Control Valve

Setting: [ LEAd ]

Second, Third, Fourth Control Valve

Setting: [ LAg ]

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

**CAUTION: Before entering Master Programming, please contact your local professional water dealer.**

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## Master Programming Mode

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### 5. Remote Signal Start (Display Code rS)

The control valve is monitored other than a meter. Regeneration begins immediately after a contact closure is received for the number of minutes programmed. The amount of time is required for a contact closure to be presented before the signal is considered to be valid.

Range = 1 – 99 minutes

Cancel Setting

Setting: [rSoF]

3-Minute Signal Time To Start Regeneration

Setting: [rS-3]

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

### 6. Gallons / Meter3 Display Format (Display Code U)

This program step sets the desired display format. The letter U in the first digit of the display identifies this program step. The possible settings include:

Gallons of water, 12 hour timekeeping, and grains of hardness

Setting: [ U - - 1 ]

M3 of water, 24 hour timekeeping, and degrees of hardness

Setting: [ U - - 4 ]

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

### 7. Unit Capacity (Display Code C)

This program step sets the capacity of the system in kilograins (or m3 X degrees for metric systems). The letter C in the first digit of the display identifies this program step. System Capacity calculates the amount of treated water (gallons or liters) that can be treated by the unit before a regeneration cycle is required.

Range = C--9 – C999 kilograins (US [U - -1])

Range = Ct1.0 – Ct2.9 thousands of kilograins or millions of grains (US [U - -1])

Range = C199 – C999 m3 X degrees (metric [U - - 4])

Range = Ct1.0 – Ct19 kilo m3 X degrees (metric [U - - 4])

450,000 grain system capacity, US display

Setting: [ C 450]

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

### 8. Capacity Safety Factor (Display Code cF)

This program step adjusts system capacity. The setting is a percentage by which the unit's capacity is reduced.

Range = 0 – 50%.

Reduce system capacity by 10%

Setting: [ cF10 ]

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

**CAUTION: Before entering Master Programming, please contact your local professional water dealer.**



### 9. Feed Water Hardness (Display Code H)

This program step sets the feed water hardness. The letter H in the first digit of the display identifies this program step. The system automatically calculates treated water capacity based on the feed water hardness entered in this program step and the system capacity entered in program step #3.

Range = 1 – 199 grains/gallon (US [U - -1])

Range = 2 – 199 degrees (metric [U - - 4])

20 grains/gallon

Setting: [ H - 20]

- Use Set Up or Set Down buttons to adjust this value.
- Press the Extra Cycle button.

### 10. Regeneration Time (No Display Code)

This program step sets time of day for the regeneration to occur. A non-flashing colon between two sets of numbers identifies the Regeneration Time display.

Range = Anytime

2 o'clock A.M. regeneration time

Setting: [ 2:00 ] (P.M. Indicator Off)

- Use Set Up or Set Down buttons to adjust this value.
- Press the Extra Cycle button.

### 11. Regeneration Day Override (Display Code A)

This program step sets the maximum amount of time (in days) the unit can be in service without a regeneration. The letter A in the first digit of the display identifies this program step. For System Type Time Clock Delayed [ 4tc ] the system regenerates at the time set in program step #5 after the number of days programmed in this step. For any Meter System Types, the system regenerates after the number of days programmed in this step at the same time of day that the previous regeneration occurred unless the meter initiates a regeneration cycle earlier.

Range = 1 – 99 (Time Clock Delayed [ 4tc ])

Range = OFF, 1 – 99 (All Meter Regeneration Types)

Override every 14 days

Option turned off

Setting: [ A -14 ]

Setting: [ AOFF ]

- Use Set Up or Set Down buttons to adjust this value.
- Press the Extra Cycle button.

### 12. Regeneration Cycle Step Programming (Display Code 1 – 6)

This program step programs the Regeneration Cycle step times. Up to 6 Regeneration Cycle steps can be programmed. The Regeneration Cycle Step being programmed is shown in the first digit of the display. Each display sets the duration time in minutes of that specific step in the regeneration cycle. For regeneration programs with less than 6 regeneration cycle steps, the time for the step # after the last active step must be set to OFF. To skip a regeneration cycle step and go to the next cycle, the setting should be at 0. If regeneration cycle step setting is OFF, the remaining cycle steps will not appear to set.

Range = OFF, 0 – 99 minutes (US [U - -1])

Range = OFF, 0 – 99 minutes (metric [U - - 4])

Regeneration Cycle Step #1 (10 minutes)

Regeneration Cycle Step #4 (Cancel)

Setting: [1- 10]

Setting: [4OFF]

- Use Set Up or Set Down buttons to adjust this value.
- Press the Extra Cycle button.

**CAUTION: Before entering Master Programming, please contact your local professional water dealer.**



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## Master Programming Mode

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### 15. Generic Flow Meter Size (Display Code F)

This program step sets the proper number of pulses generated by the flow meter for each gallon or liter of water flow.

Range = 0.1 – 99.9 pulses per gallon

100 – 199 pulses per gallon

Range = 0.1 – 99.9 pulses per liter

100 – 199 pulses per liter

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

### 16. Line Frequency (Display Code LF)

This program step sets the frequency of the power supply. When the line frequency is properly set, all timekeeping functions remain accurate. The letters LF in the first digit of the display identify this program step. The possible settings are:

60Hz Line Frequency

Setting: [LF60]

50Hz Line Frequency

Setting: [LF50]

— Use Set Up or Set Down buttons to adjust this value.

— Press the Extra Cycle button.

### Exiting the Master Programming Mode

— Press the Extra Cycle button once more to exit Master Program Mode.

After leaving Master Programming mode the abbreviation CALc appears on the display indicating that volume is being calculated (initial communication is taking place if the System Type is 7 or 9).

**NOTE: The length of time CALc displays is dependent on the calculated volume and could be a minute or more.**

### Time of Day

Finish the control programming by setting the time of day. With the controller in Normal Operating Mode (not in Master Programming Mode or User Programming Mode), set the time by pressing Set Up or Set Down buttons.

**NOTE: Do NOT press the Extra Cycle button after setting the time or a regeneration cycle may be initiated.**

Verify the following menu structure for each System Type. An “X” indicates that parameter is available. (Note parameters before System Type are not included here)

Parameter	4tc	4FI	4Fd	5FI	6 & 7	6 & 7	9FI
Valve Position (Lead or Lag)				Lead/Lag	Lead	Lag	Lead/Lag
Remote Start (Set to rSoF)		X		X	X		X
Display Format (U–x)	X	X	X	X	X	X	X
System Capacity (Cxxx)		X	X	X	X	X	X
Capacity Safety Factor		X	X	X	X	X	X
Feed Water Hardness		X	X	X	X		X
Regeneration Time (xx:xx)	X	X	X	X	X	X	X
Regeneration Day Override (Axxx)	X	X	X	X	X	X	X
Regeneration Cycle Step Times (1-xx, 2-xx, etc)	X	X	X	X	X	X	X
Auxiliary Relay (AroF)	X	X	X	X	X	X	X
Chemical Pump Output (cPOF)		X	X	X	X		X
Flow Meter Size (FFxx)		X	X	X	X		X
Line Frequency (LFxx)	X	X	X	X	X	X	X

**CAUTION: Before entering Master Programming, please contact your local professional water dealer.**

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# Operation Display Definitions & Examples

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## Time of Day

Format = US/Gallons



## Calculating the Volume Remaining



Format = Metric/Meter<sup>3</sup>



## Communication Error



## Volume Remaining

L = Display Code (X 1,000,000)

Range = 1,000,000 - 2,900,000



## Programming Error



t = Display Code (X 1000)

Range = 10,000 - 999,999



## Timer is Locked Out



No Display Code

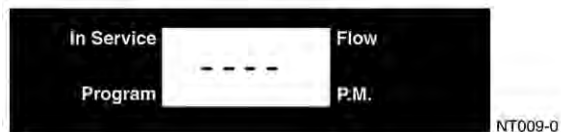
Range = 1 - 9,999



## Remote Signal Start Signal is Communicating



Zero



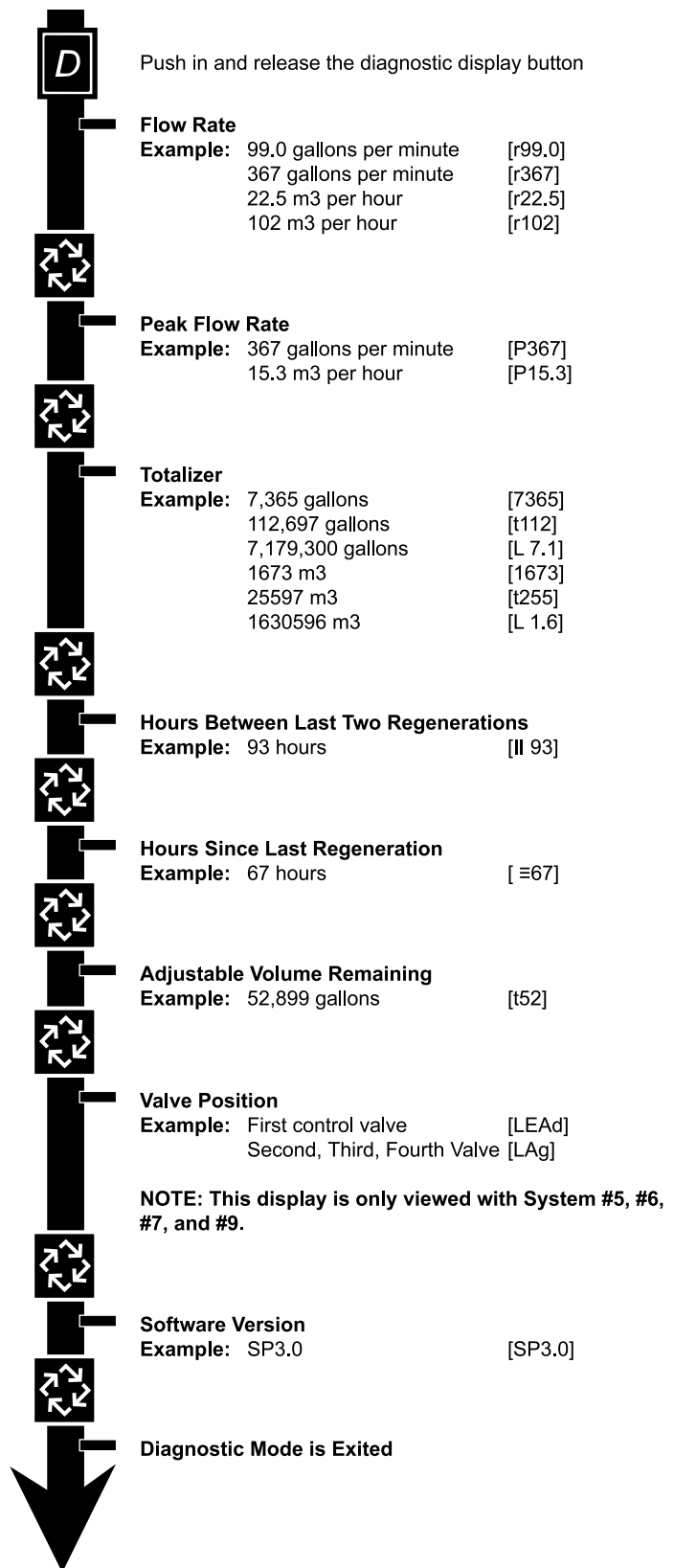
## Remote Lock Out Signal is On



# Diagnostic Programming Mode Flow Chart

## NOTE:

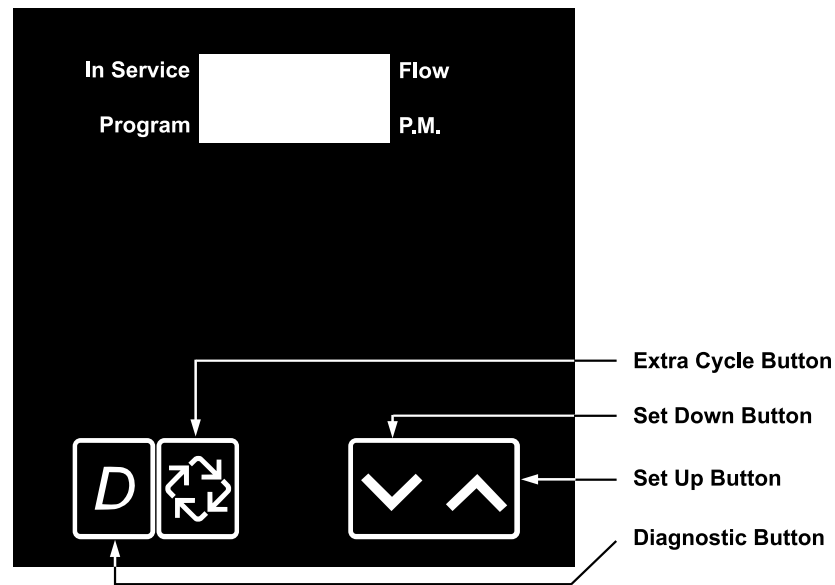
1. Push and release the “D” button.
2. Press the Extra Cycle button once per display until all displays are viewed and Normal Display is resumed.
3. Press and release the “D” button at anytime during diagnostic mode and the timer will exit the mode.
4. Depending on current valve programming, certain displays may not be able to be viewed or set.



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# Diagnostic Programming Guide

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When the Diagnostics Mode is entered, all available displays are viewed as needed. Depending on current option settings, some displays cannot be viewed.

## Overview Diagnostic Mode

The current diagnostic will be displayed until Extra Cycle key is pressed. There is no time limit on each display. The timer will display local information, not system information. In the event of regeneration occurring while displaying diagnostics, the regeneration step and time remaining will be displayed. When regeneration has been completed, the display will return to diagnostic display.

## Entering and Exiting Diagnostic Mode

Push and Release the "D" button to enter. Pressing the Extra Cycle button will move to the next diagnostic to be displayed. Push the Extra Cycle button once per display until all are viewed. The Diagnostic Mode is exited and normal operation resumes. Pressing the Diagnostic button, while in the Diagnostic Mode, will cause the unit to leave the Diagnostic Mode and return to the normal time of day display.

### 1. Flow Rate (Display Code r)

Flow Rate for this particular Timer will be calculated and displayed. Flow rates will be calculated over the time between pulses up to 20 seconds. Times between pulses longer than 20 seconds will be ignored. If the display is flashing, the flow rate has exceeded the range and will not calculate. The display updates once per second.

Display example: r100

Range = 0.0 – 99.9 gpm, 100 – 500gpm

Range = 0.0 – 99.9 m<sup>3</sup>/h, 100 – 113 m<sup>3</sup>/h

— Depress the Extra Cycle button.

### 2. Peak Flow Rate (Display Code P)

The Peak Flow Rate since the last regeneration will be captured. Reset to zero by holding up and down keys for 5 seconds during the Peak Flow Rate display.

Display example: P100

Range = 0.0 – 99.9 gpm, 100 – 500gpm

Range = 0.0 – 99.9 m<sup>3</sup>/h, 100 – 113 m<sup>3</sup>/h

— Depress the Extra Cycle button.



# Diagnostics Display Definitions & Examples

## Flow Rate

r = Display Code

Range = 1 - 99.9



Range = 100 - 500



## Peak Flow Rate

P = Display Code

Range = 0 - 500



## Totalizer

L = Display Code (X 1,000,000)

Range = 1,000,000 - 99,999,999



t = Display Code (X 1000)

Range = 10,000 - 999,999



## No Display Code

Range = 1 - 9,999



## Hours Between Last Two Regenerations

II = Display Code

Range = 1 - 199



## Hours Since Last Regeneration

≡ = Display Code

Range = 1 - 199



## Adjustable Volume Remaining

L = Display Code (X 1,000,000)

Range = 1,000,000 - 2,900,000



t = Display Code (X 1000)

Range = 10,000 - 999,999



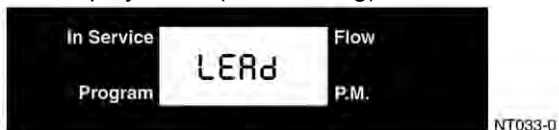
## No Display Code

Range = 1 - 9,999



## Valve Position

No Display Code (Lead or Lag)



## Software Version

SP = Display Code







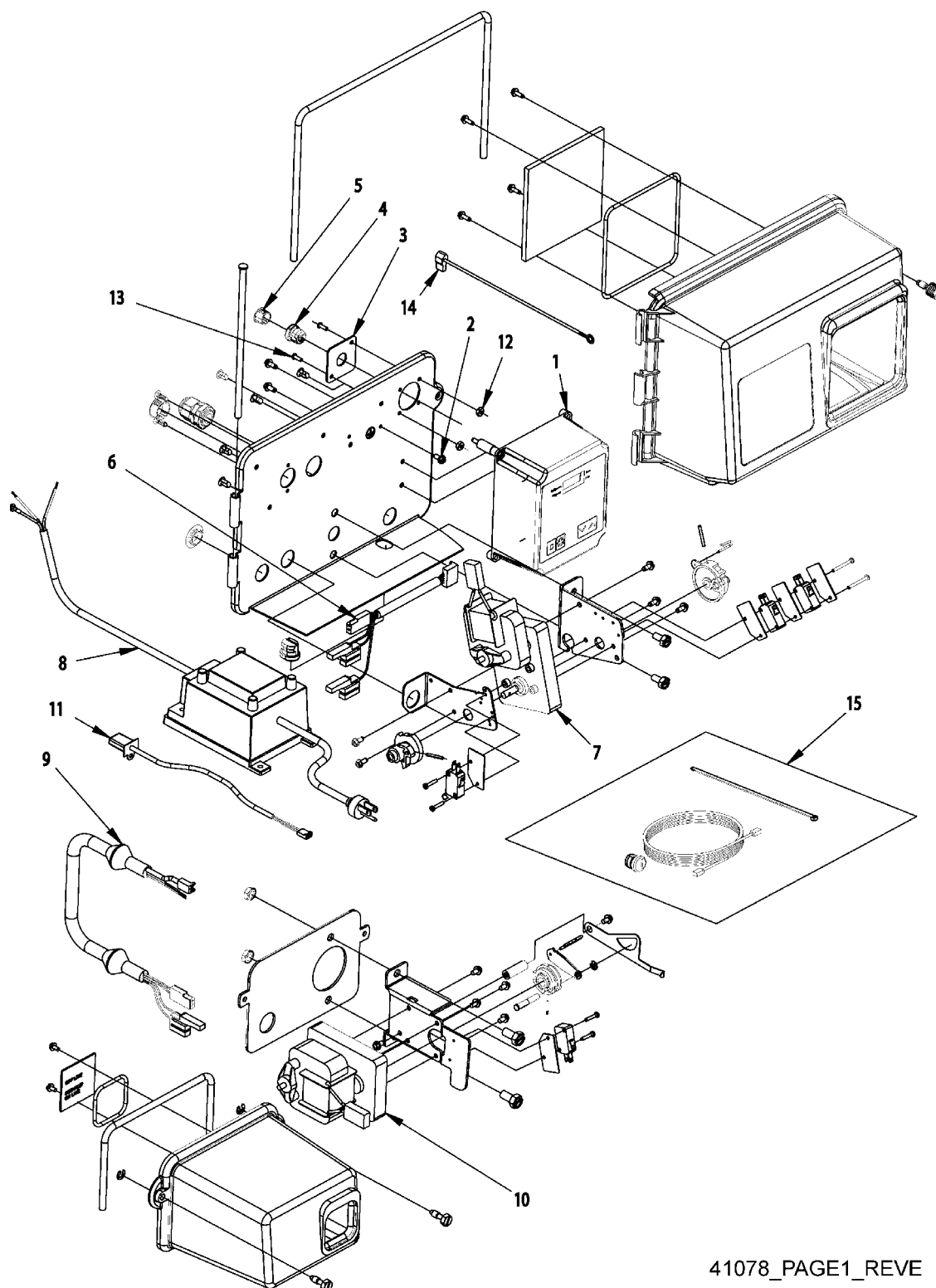
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## ***Power Head Assembly***

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### ***2750/2850/2900 Upper Drive and 2900 Lower Drive***

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41078\_PAGE1\_REVE

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## ***Power Head Assembly Parts List***

---

### ***2750/2850/2900 Upper Drive and 2900 Lower Drive***

---

<b>Item No.</b>	<b>Quantity</b>	<b>Part No.</b>	<b>Description</b>
1.....	1 .....	41062 .....	3200NT Timer Assy
2.....	1 .....	14202-01 .....	Screw, Hex Wsh Mach, 8-32 x 5/16
3.....	1 .....	40959 .....	Bracket, Strain Relief, 3200NT
4.....	1 .....	41071 .....	Strain Relief, NT Communication Cable
5.....	1 .....	41035 .....	Plug, Strain Relief
6.....	1 .....	40941 .....	Harness, Upper Drive
7.....	1 .....	40385 .....	Motor, Drive, 24V 50/60 Hz
8.....	1 .....	41034 .....	Transformer, US 120V/24V, 108VA 3200NT
		41049 .....	Transformer, Euro, 230V/24V
		41050 .....	Transformer, Aust, 230V/24V
9.....	1 .....	40943 .....	Wire Harness, Lower Drive w/Molded Strain Relief
10.....	1 .....	40388 .....	Motor, Drive, 24V, 50/60 Hz
11.....	1 .....	19121-08 .....	Meter Cable Assy, NT, 35" w/Connector
		19121-09 .....	Meter Cable Assy, NT, 99.5" w/Connector
		19121-10 .....	Meter Cable Assy, NT, 303.5" w/Connector
12.....	2 .....	12732 .....	Nut, Hex, 5-40
13.....	2 .....	10299 .....	Screw, Slot Rnd, 5-40 x 3/8
14.....		40175-03 .....	Ground Wire Assy, Earth
15.....	1 .....	41047 .....	Kit, Communication Cable
Not Shown ...	1 .....	41228 .....	Codes, 3200NT

**NOTE:** For all other service part numbers, see the Service Manual that accompanies the control valve.

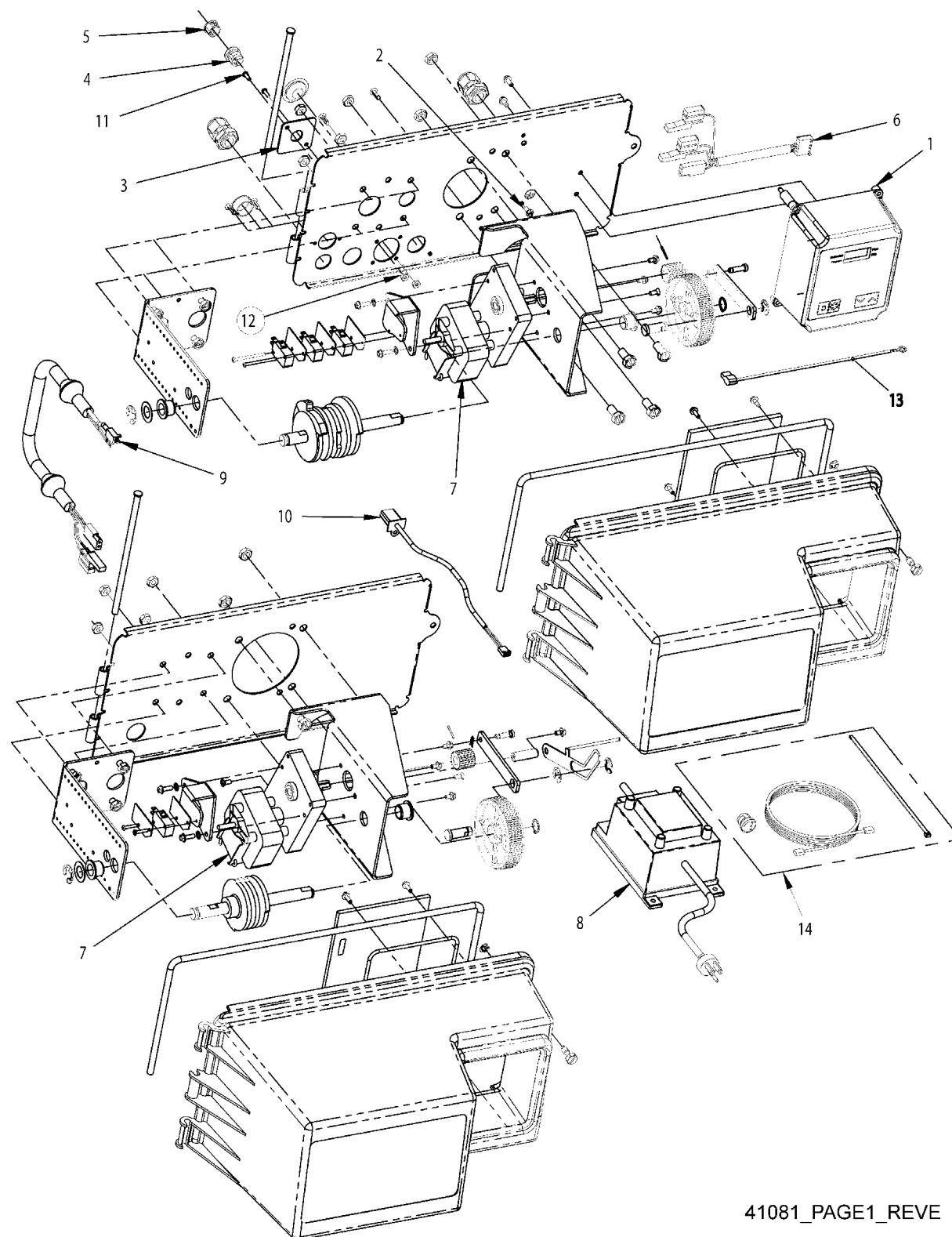
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## ***Power Head Assembly***

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### ***3150/3900 Upper Drive and 3900 Lower Drive***

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41081\_PAGE1\_REVE

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## ***Power Head Assembly Parts List***

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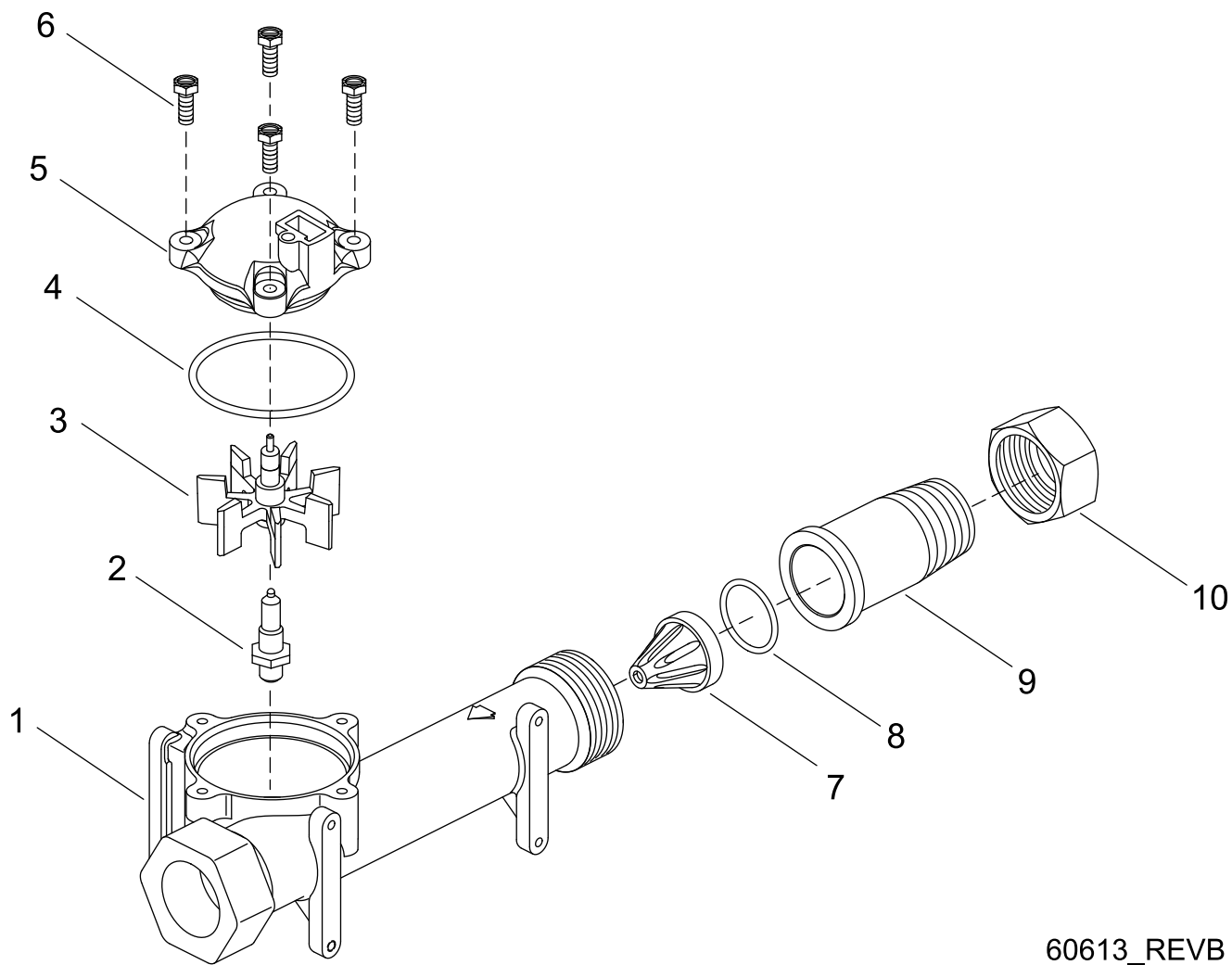
### ***3150/3900 Upper Drive and 3900 Lower Drive***

---

<b>Item No.</b>	<b>Quantity</b>	<b>Part No.</b>	<b>Description</b>
1.....	1 .....	41062 .....	3200NT Timer Assy
2.....	1 .....	14202-01 .....	Screw, Hex Wsh Mach, 8-32 x 5/16
3.....	1 .....	40959 .....	Bracket, Strain Relief, 3200NT
4.....	1 .....	41071 .....	Strain Relief, NT Communication Cable
5.....	1 .....	41035 .....	Plug, Strain Relief
6.....	1 .....	40941 .....	Harness, Upper Drive
7.....	2 .....	40391 .....	Motor, Drive, 24V, 50/60 Hz
8.....	1 .....	41034 .....	Transformer, US 120V/24V, 108VA 3200NT
		41049 .....	Transformer, Euro, 230V/24V
		41050 .....	Transformer, Aust, 230V/24V
9.....	1 .....	40943 .....	Wire Harness, Lower Drive w/Molded Strain Relief
10.....	1 .....	19121-08 .....	Meter Cable Assy, NT, 35" w/Connector
		19121-09 .....	Meter Cable Assy, NT, 99.5" w/Connector
		19121-10 .....	Meter Cable Assy, NT, 303.5" w/Connector
11.....	2 .....	10299 .....	Screw, Slot Rnd, 5-40 x 3/8
12.....	2 .....	12732 .....	Nut, Hex, Machine, #5-40
13.....	1 .....	40175-03 .....	Ground Wire Assy, Earth
14.....	1 .....	41047 .....	Kit, Communication Cable
Not Shown ...	1 .....	41228 .....	Card, Codes, 3200NT

**NOTE:** For all other service part numbers, see the Service Manual that accompanies the control valve.

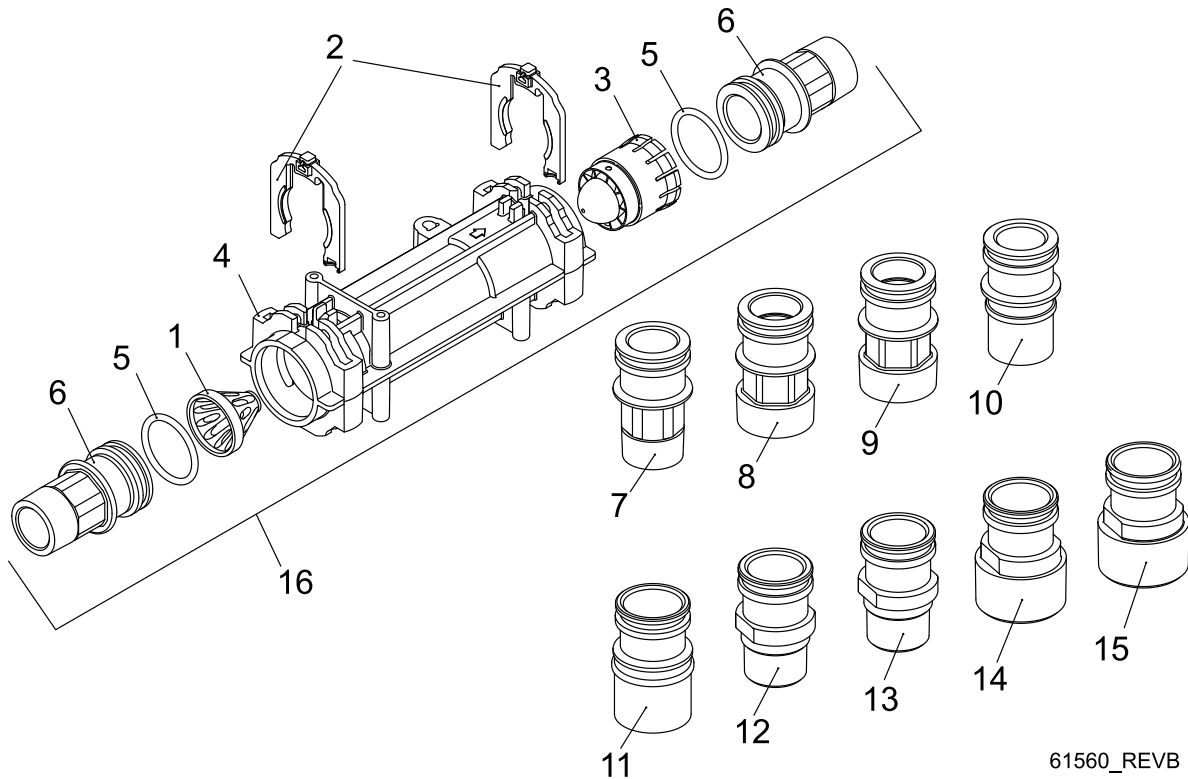
# 1" Brass Paddle Meter



60613\_REVB

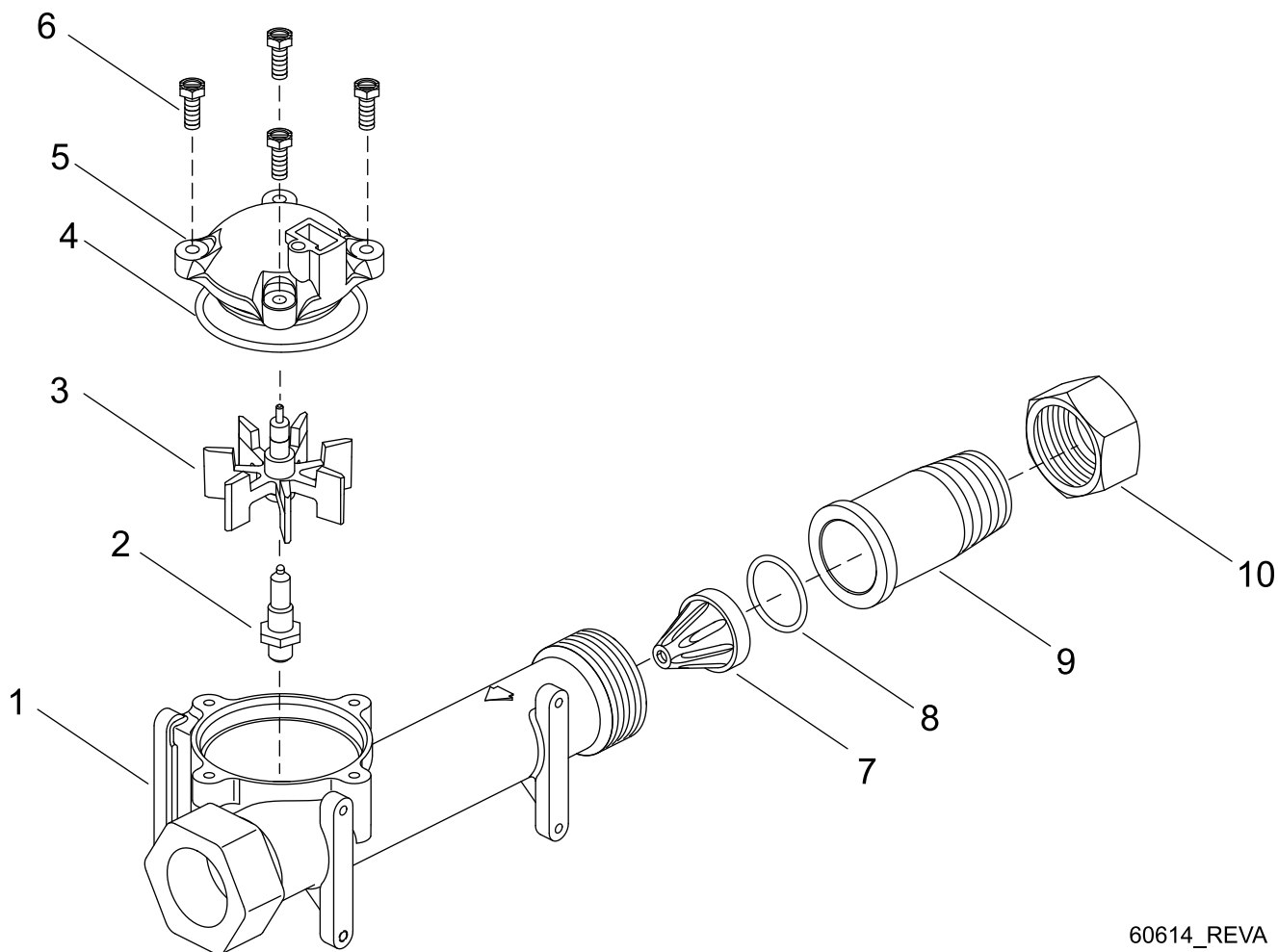
Item No. ....	Quantity .....	Part No. ....	Description
1.....	1 .....	14959 .....	Body, Meter, 2750
2.....	1 .....	13882 .....	Post, Meter Impeller
3.....	1 .....	13509 .....	Impeller, Meter
4.....	1 .....	13847 .....	O-ring, -137, Std/560CD, Meter
5.....	1 .....	14716 .....	Meter Cap Assy, ET/NT
6.....	4 .....	12112 .....	Screw, Hex Hd Mach, 10-24 x 1/2 18-8 S.S.
7.....	1 .....	14960 .....	Flow Straightener, 1"
8.....	1 .....	13287 .....	O-ring, -123
9.....	1 .....	14961 .....	Fitting, 1" Quick Connector
10.....	1 .....	14962 .....	Nut, 1" Meter, Q/C

# 1" & 1 1/2" Plastic Turbine Meter



Item No.	Quantity	Part No.	Description
1.....	1 .....	17542 .....	Flow Straightener, 1 1/2"
2.....	1 .....	40576 .....	Clip, H, Plastic, 7000
3.....	1 .....	40577 .....	Turbine Meter Assy, 7000
4.....	1 .....	41555 .....	Body, Remote Meter
5.....	1 .....	40951 .....	O-ring, -220
6.....	1 .....	40563 .....	Connector, 1" NPT, 7000
7.....	1 .....	40563-10 .....	Connector, 1" BSP, 7000
8.....	1 .....	40565 .....	Connector, 1 1/4" NPT, 7000
9.....	1 .....	40565-10 .....	Connector, 1 1/4" BSP, 7000
10.....	1 .....	41242 .....	Connector, 1" & 1 1/4" Sweat
11.....	1 .....	41243 .....	Connector, 1 1/4" & 1 1/2" Sweat
12.....	1 .....	41596 .....	Connector, Brass, 1" NPT
13.....	1 .....	41596-10 .....	Connector, Brass, 1" BSP
14.....	1 .....	41597 .....	Connector, Brass, 1 1/2" NPT
15.....	1 .....	41597-10 .....	Connector, Brass, 1 1/2" BSP
16.....	1 .....	61560-01 .....	Meter Assy, In-Line, w/1" NPT Plstc Connector
		61560-02 .....	Meter Assy, In-Line, w/1" BSP Plstc Connector
		61560-03 .....	Meter Assy, In-Line, w/1 1/4" NPT Plstc Connector
		61560-04 .....	Meter Assy, In-Line, w/1 1/4" BSP Plstc Connector
		61560-05 .....	Meter Assy, In-Line, w/1" & 1 1/4" Sweat Connector
		61560-06 .....	Meter Assy, In-Line, w/1 1/4" & 1 1/2" Sweat Connector
		61560-07 .....	Meter Assy, In-Line, w/1" NPT Brass Connector
		61560-08 .....	Meter Assy, In-Line, w/1" BSP Brass Connector
		61560-09 .....	Meter Assy, In-Line, w/1 1/2" NPT Brass Connector
		61560-10 .....	Meter Assy, In-Line, w/1 1/2" BSP Brass Connector

# 1 1/2" Brass Paddle Meter



60614\_REVA

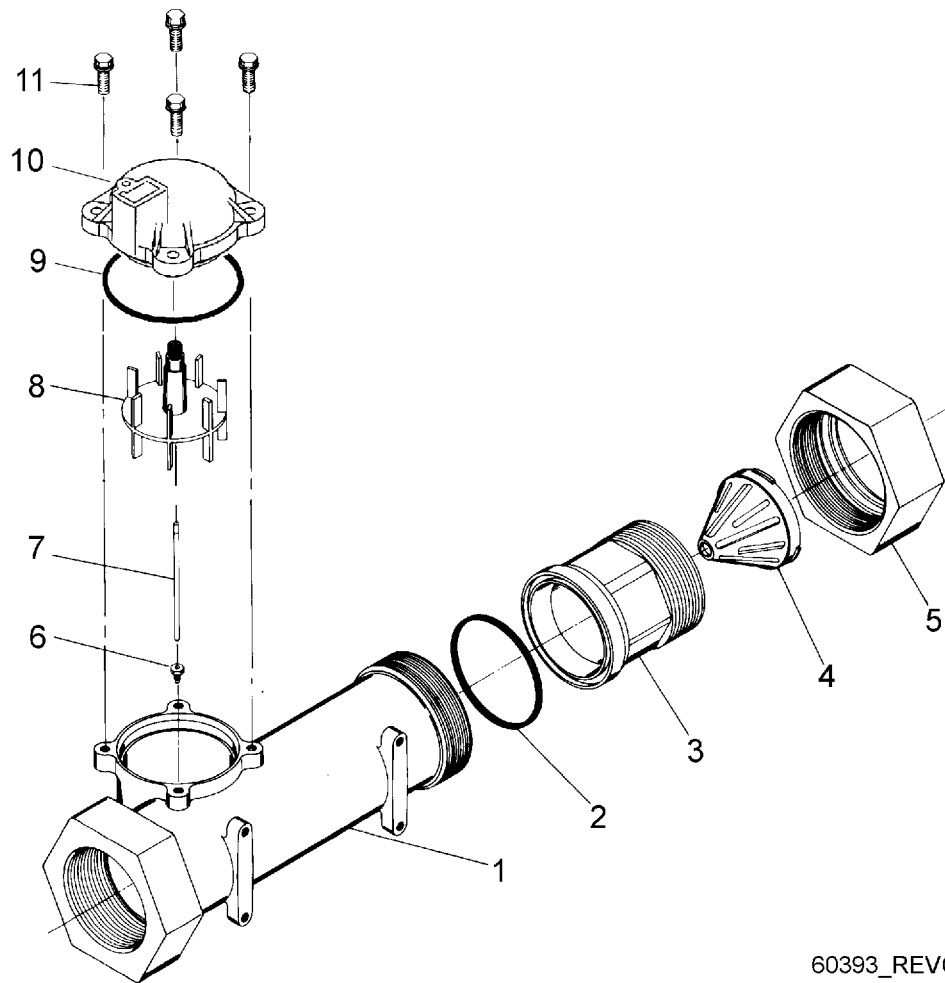
Item No.	Quantity	Part No.	Description
1.....	1 .....	17569 .....	Body, Meter, 2850/9500
2.....	1 .....	13882 .....	Post, Meter Impeller
3.....	1 .....	13509 .....	Impeller, Meter
4.....	1 .....	13847 .....	O-Ring, -137, Std/560CD, Meter
5.....	1 .....	14716 .....	Meter Cap Assy, ET/NT
6.....	4 .....	17798 .....	Screw, Hex Hd Mach, 10-24 x 1/2 18-8 S.S.
7.....	1 .....	17542 .....	Flow Straightener, 1 1/2"
8.....	1 .....	12733 .....	O-Ring, -132
9.....	1 .....	17544 .....	Fitting, 1 1/2" Quick Connector
10.....	1 .....	17543 .....	Nut, 1 1/2", Q/C
11.....	1 .....	14716 .....	Meter Cap Assy, ET/NT
Not Shown ...	1 .....	17790 .....	Sleeve, Meter, 1 1/2" x 1"



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## 2" Brass Paddle Meter

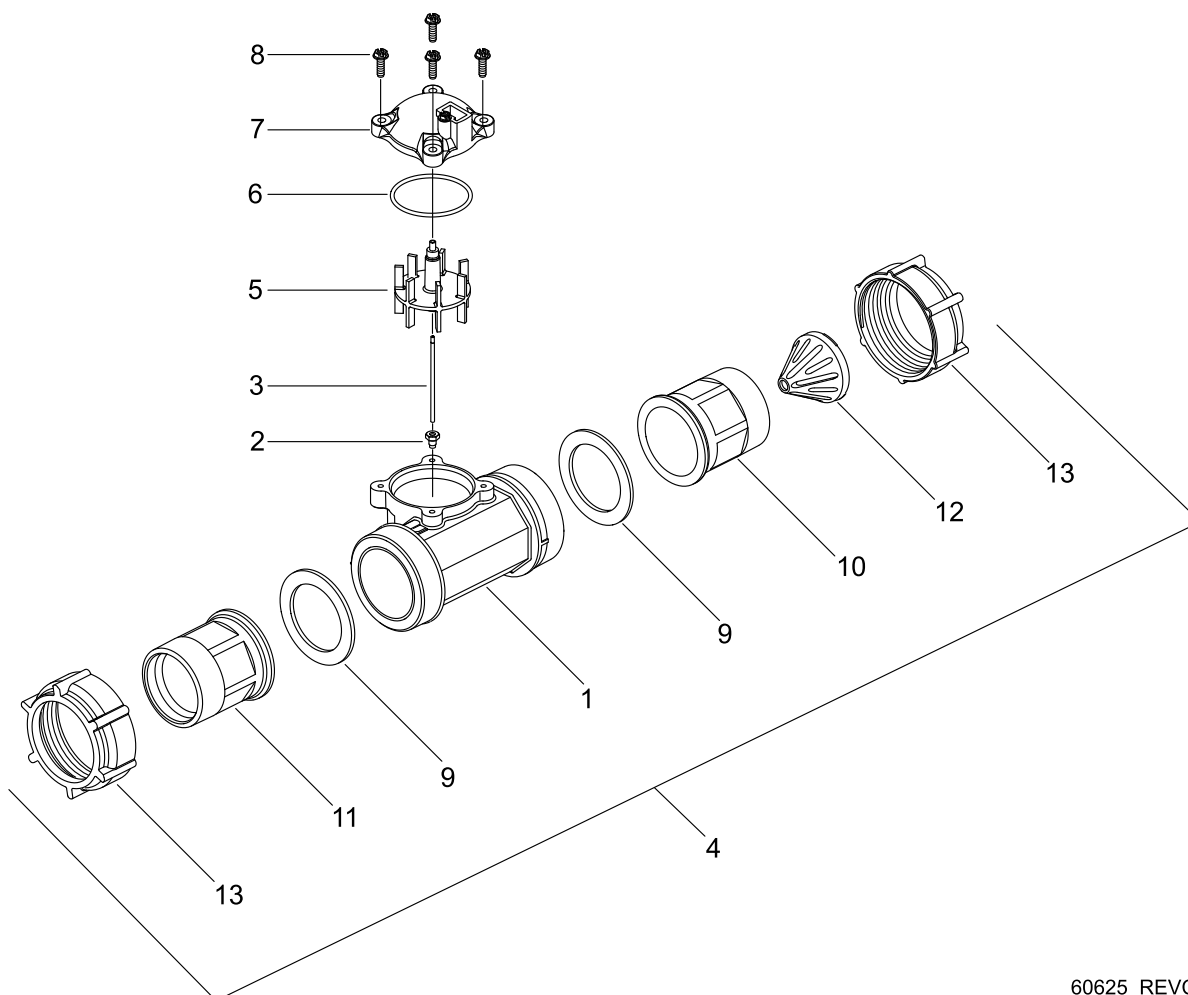
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60393\_REVC

Item No.	Quantity	Part No.	Description
1.....	1 .....	14456 .....	Body, Meter, 2"
2.....	1 .....	14679 .....	O-ring, -227, Meter
3.....	1 .....	14568 .....	Fitting, Nipple, 2"
4.....	1 .....	14680 .....	Flow Straightener
5.....	1 .....	14569 .....	Nut, 2900 Meter
6.....	1 .....	15532 .....	Seat, Impeller Shaft, Hex
7.....	1 .....	15432 .....	Shaft, Impeller, SS
8.....	1 .....	15374 .....	Impeller Assy, 2" Meter
9.....	1 .....	13847 .....	O-ring, -137, Std/560CD, Meter
10.....	1 .....	14716 .....	Meter Cap Assy, ET/NT
11.....	4 .....	12112 .....	Screw, Hex Hd Mach, 10-24 x 1/2

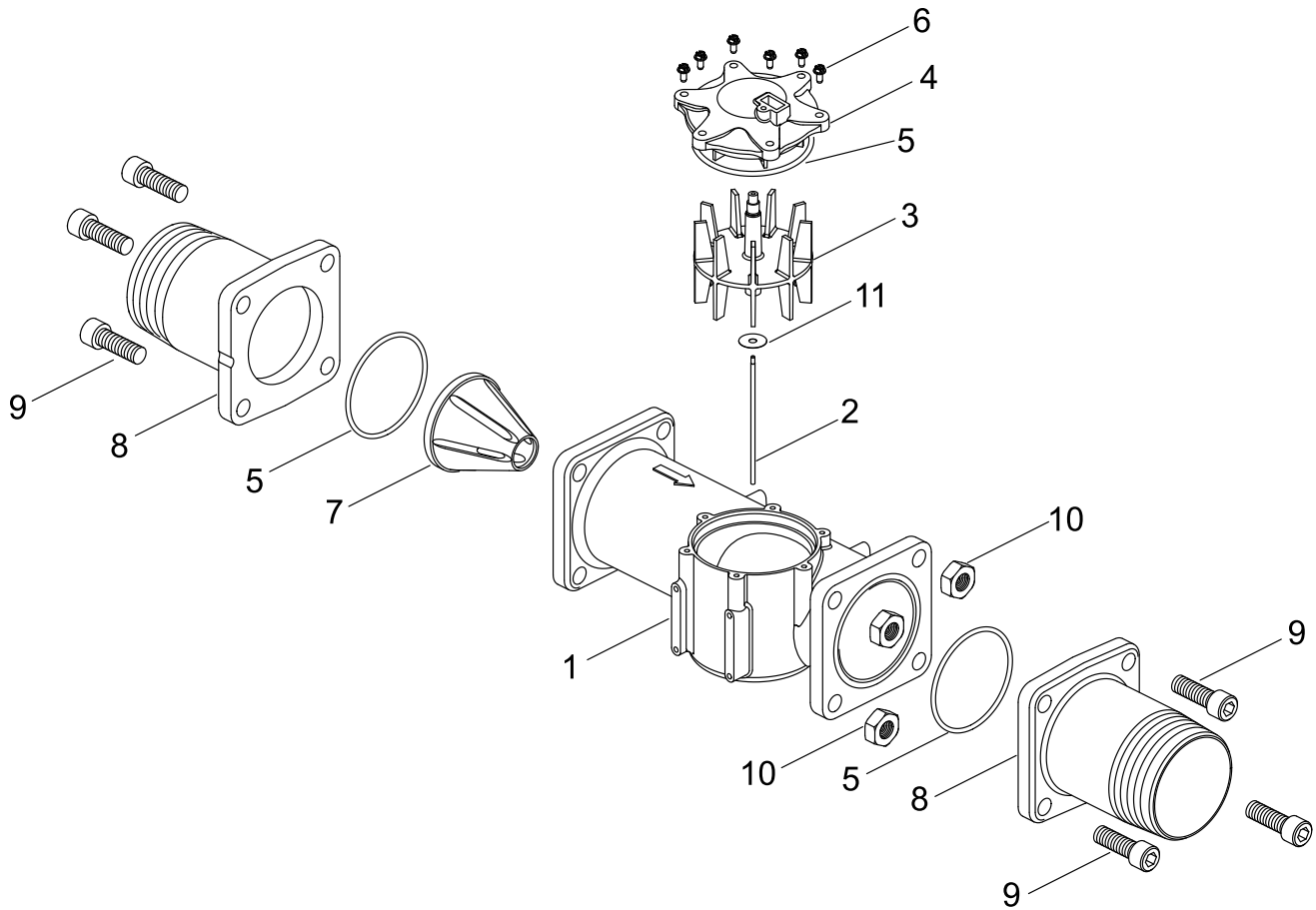
## 2" Plastic Paddle Meter



60625\_REVC

Item No.	Quantity	Part No.	Description
1.....	1 .....	17689 .....	Body, Meter, 2" Plastic w/Impeller Shaft Seat
2.....	1 .....	15532 .....	Seat, Impeller Shaft, Hex
3.....	1 .....	15432 .....	Shaft, Impeller, SS
4.....	1 .....	60620 .....	Meter Assembly, 2" Plastic, Std
		60621 .....	Meter Assembly, 2" Plastic, Ext
		60625 .....	Meter Assembly, 2" Plastic, Electronic
5.....	1 .....	15374 .....	Impeller Assy, 2" Meter
6.....	1 .....	13847 .....	O-Ring, -137, Std/560CD, Meter
7.....	1 .....	14716 .....	Meter Cap Assy, ET/NT
8.....	4 .....	12473 .....	Screw, Hex Wsh, 10-24 x 5/8 18-8 S.S.
9.....	2 .....	40666 .....	Seal, Face, 2", Plastic Meter
10.....	1 .....	17987-001 .....	Fitting, Nipple, 2", Plastic, NPT, Machined, Flow Straightener
		17987-101 .....	Fitting, Nipple, 2", Plastic, BSP, Machined, Flow Straightener
11.....	1 .....	17987-000 .....	Fitting, Nipple, 2", Plastic, NPT
		17987-100 .....	Fitting, Nipple, 2", Plastic, BSP
12.....	1 .....	14680 .....	Flow Straightener
13.....	2 .....	17988 .....	Nut, 2" Meter

## 3" Brass Paddle Meter



60617\_REVA

Item No.	Quantity	Part No.	Description
1.....	1 .....	16254 .....	Body, Meter, 3900
2.....	1 .....	16279 .....	Shaft, Impeller
3.....	1 .....	16575 .....	Impeller Assy, 3"
4.....	1 .....	14716-01 .....	Meter Cap Assy, 3", ET
5.....	3 .....	15707 .....	O-ring, -236
6.....	6 .....	12112 .....	Screw, Hex Hd Mach, 10-24 x 1/2
7.....	1 .....	16280 .....	Flow Straightener
8.....	2 .....	16328 .....	Adapter, Flange, 3"
9.....	8 .....	40118 .....	Screw, Sckt Hd, 1/2 - 13
10.....	8 .....	16386 .....	Nut, Hex Jam, 1/2 - 13
11.....	1 .....	16574 .....	Washer, Plain, SS

# 2750/2850 Timer Wiring Diagram

## TYPICAL 2750NT/2850NT INPUT AND OUTPUT WIRING

### OPTIONAL CUSTOMER WIRING:

P3 FLOW METER - NOT REQUIRED FOR TIME CLOCK OR REMOTE SIGNAL START

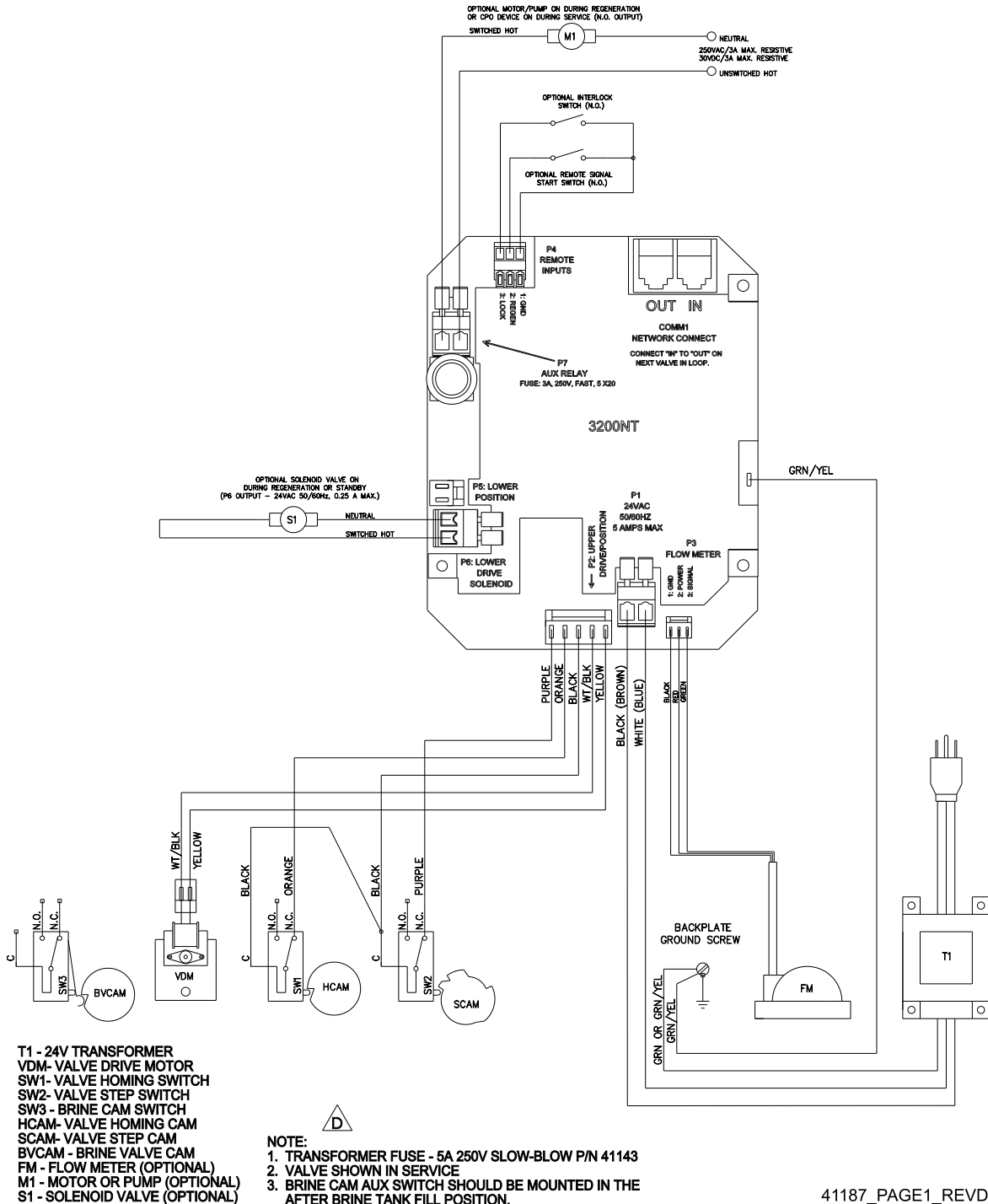
REGENERATION APPLICATIONS

P4 REMOTE LOCKOUT INPUT - CLOSED INPUT PREVENTS REGENERATION

P4 REMOTE SIGNAL START - CLOSED INPUT INITIATES REGENERATION

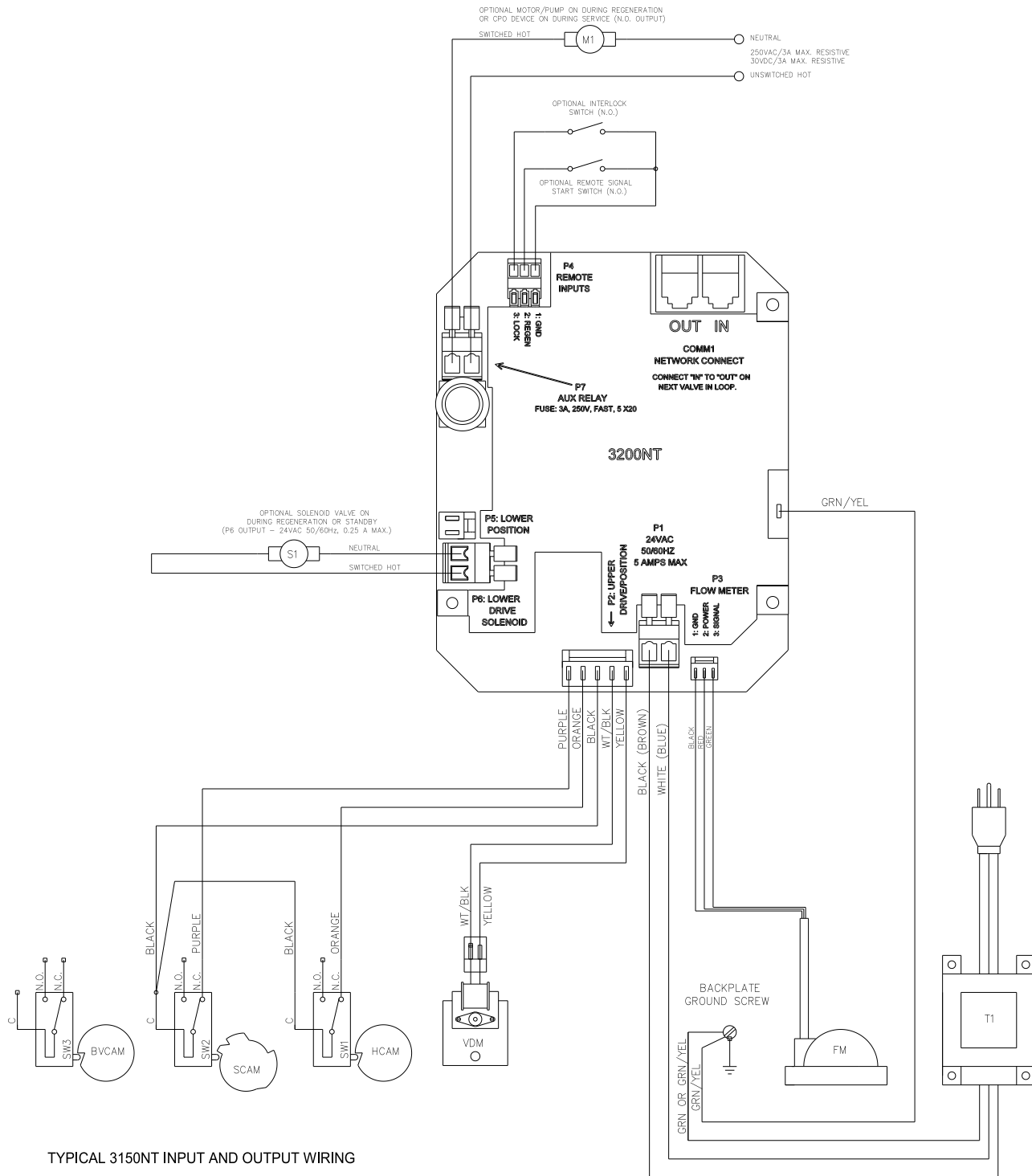
P6 SOLENOID DRIVE OUTPUT - REQUIRED FOR ALTERNATING REGENERATION SYSTEMS ONLY

COMM1 NETWORK CONNECT - REQUIRED FOR MULTI-TANK SYSTEMS ONLY



41187\_PAGE1\_REVD

# 3150 Timer Wiring Diagram



TYPICAL 3150NT INPUT AND OUTPUT WIRING

OPTIONAL CUSTOMER WIRING:

P3 FLOW METER - NOT REQUIRED FOR TIME CLOCK OR REMOTE SIGNAL START  
REGENERATION APPLICATIONS

P4 REMOTE LOCKOUT INPUT - CLOSED INPUT PREVENTS REGENERATION

P4 REMOTE SIGNAL START - CLOSED INPUT INITIATES REGENERATION

P6 SOLENOID DRIVE OUTPUT - REQUIRED FOR ALTERNATING REGENERATION SYSTEMS ONLY

COMM1 NETWORK CONNECT - REQUIRED FOR MULTI-TANK SYSTEMS ONLY

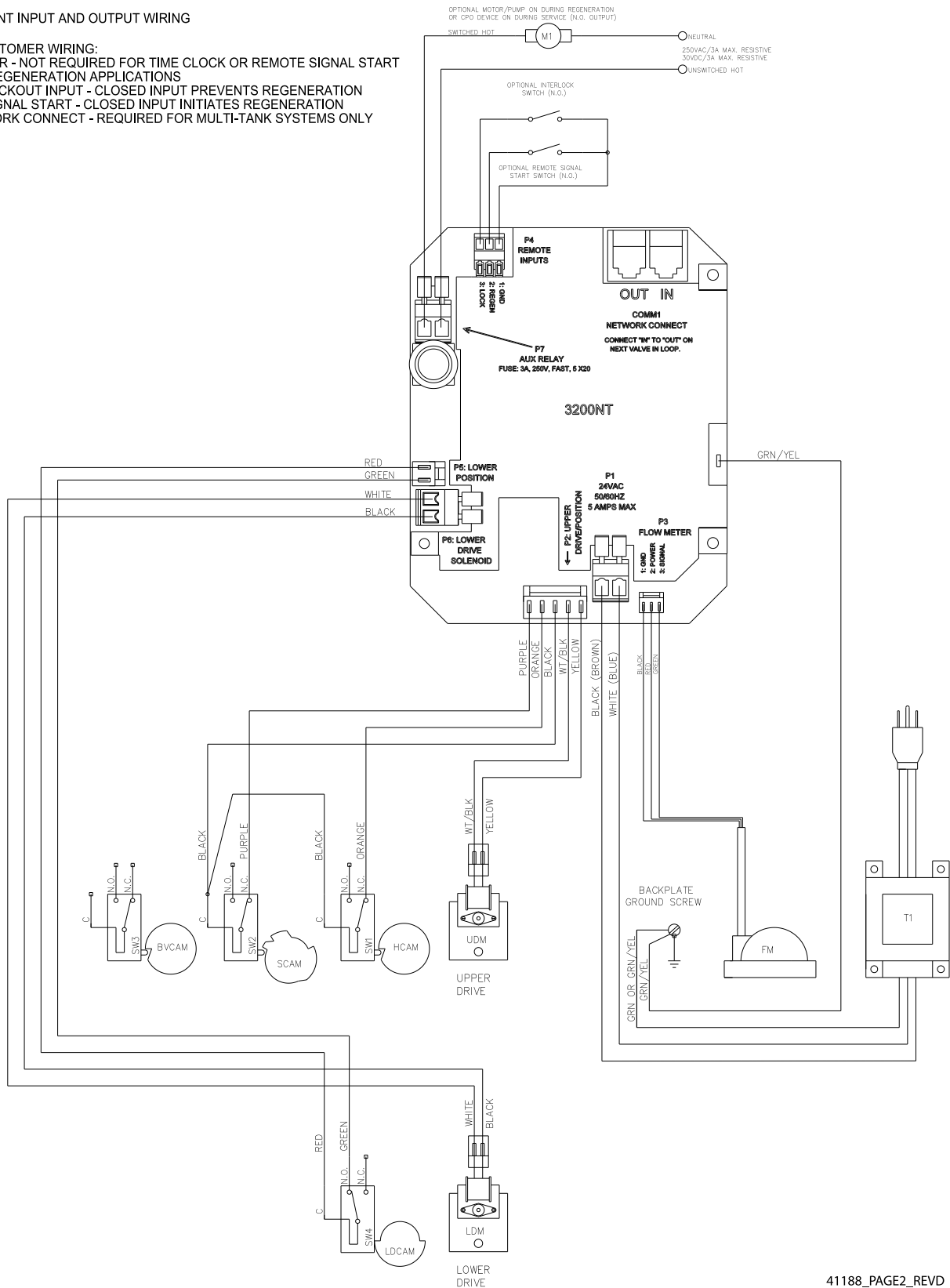
41187\_PAGE2\_REV D



# 3900 Timer Wiring Diagram

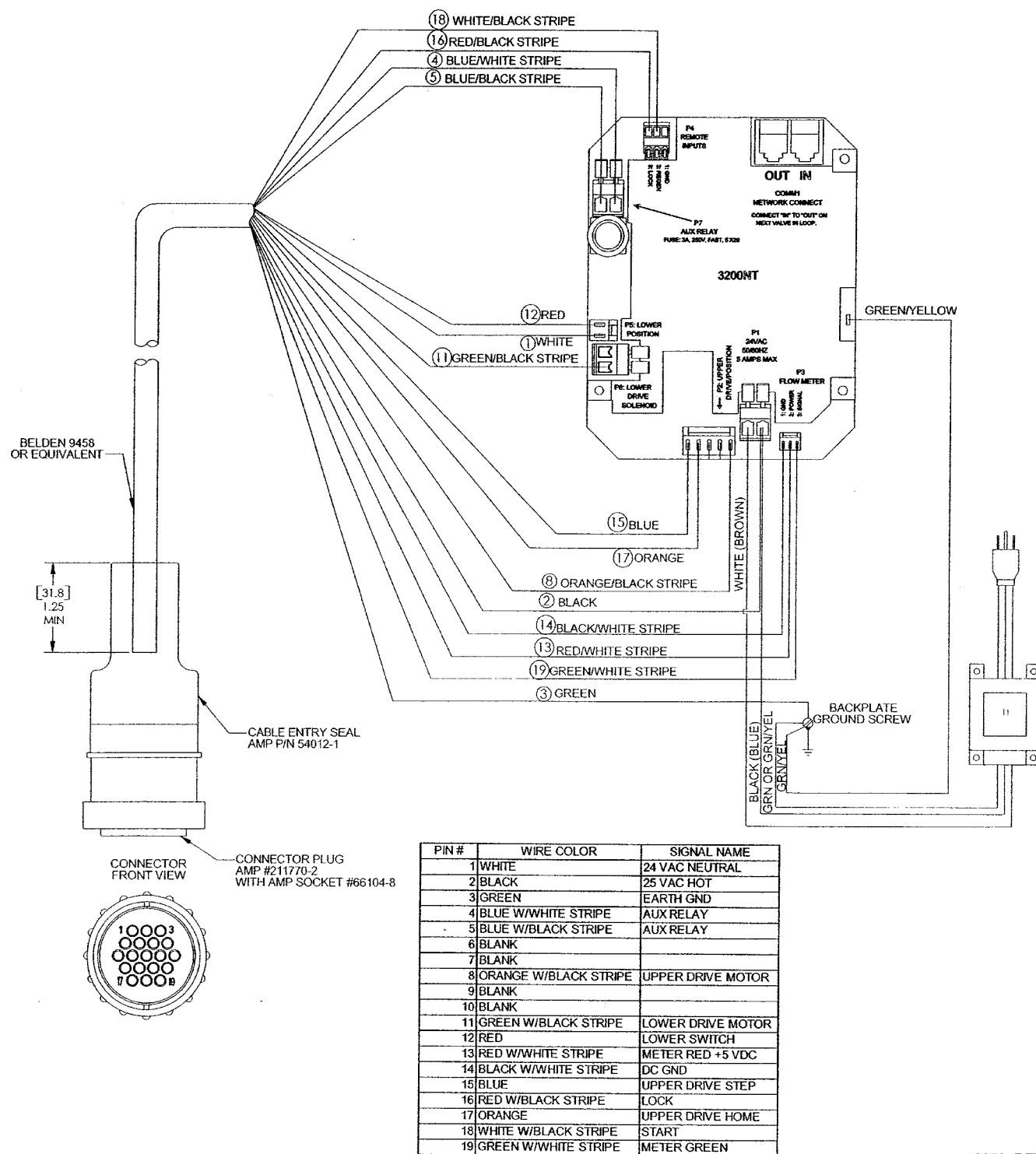
## TYPICAL 3900NT INPUT AND OUTPUT WIRING

OPTIONAL CUSTOMER WIRING:  
P3 FLOW METER - NOT REQUIRED FOR TIME CLOCK OR REMOTE SIGNAL START  
REGENERATION APPLICATIONS  
P4 REMOTE LOCKOUT INPUT - CLOSED INPUT PREVENTS REGENERATION  
P4 REMOTE SIGNAL START - CLOSED INPUT INITIATES REGENERATION  
COMM1 NETWORK CONNECT - REQUIRED FOR MULTI-TANK SYSTEMS ONLY



41188\_PAGE2\_REV D

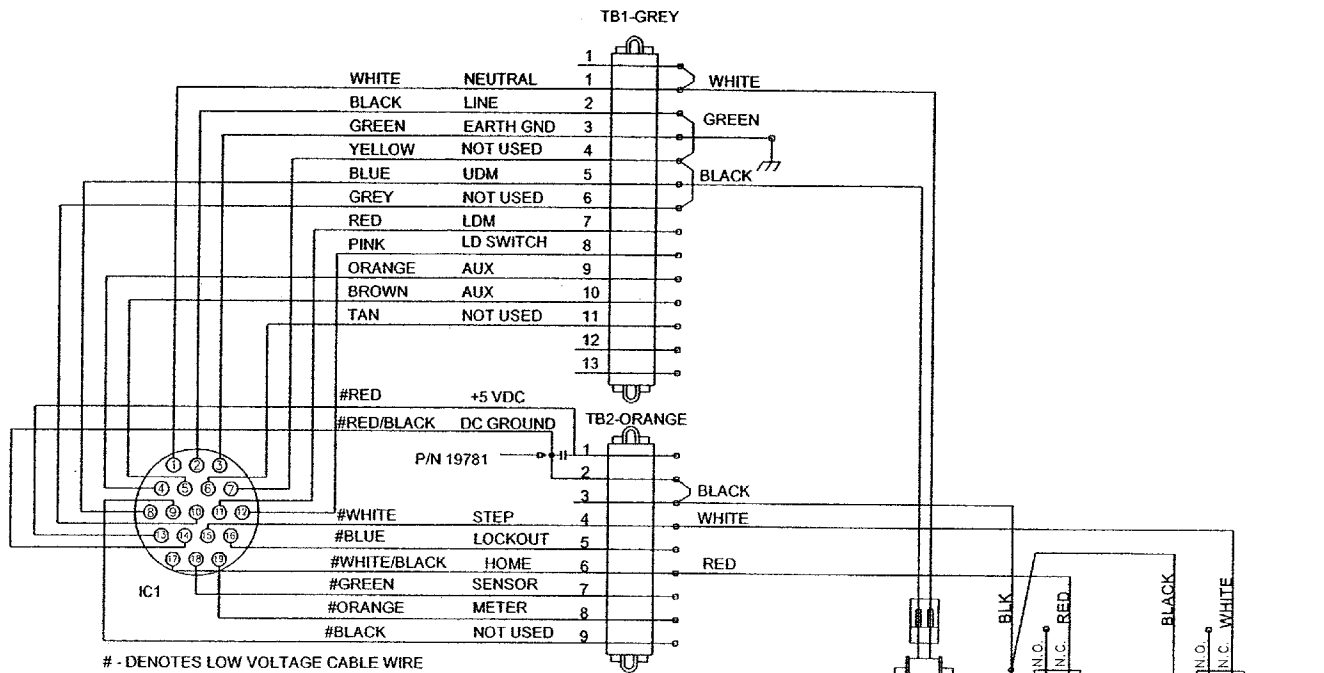
# 3200NT Remote Timer Wiring Diagram



42073\_REVA

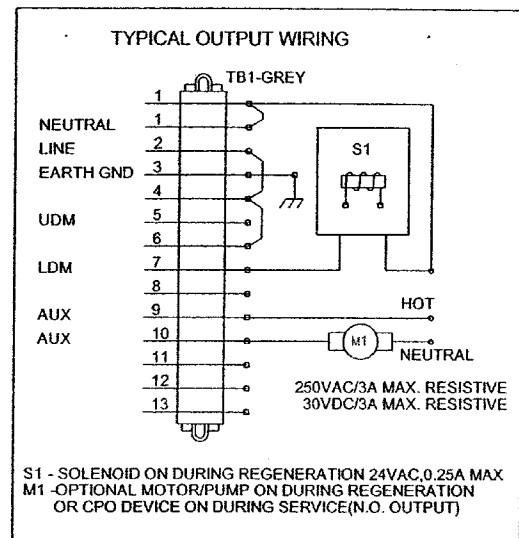
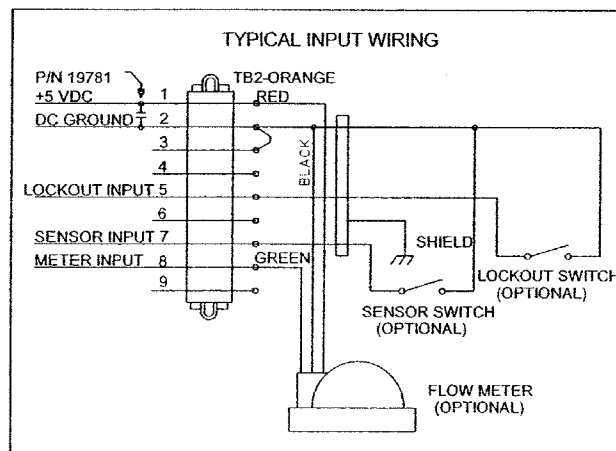


# 2750/2850 - 3200NT Remote Wiring Diagram



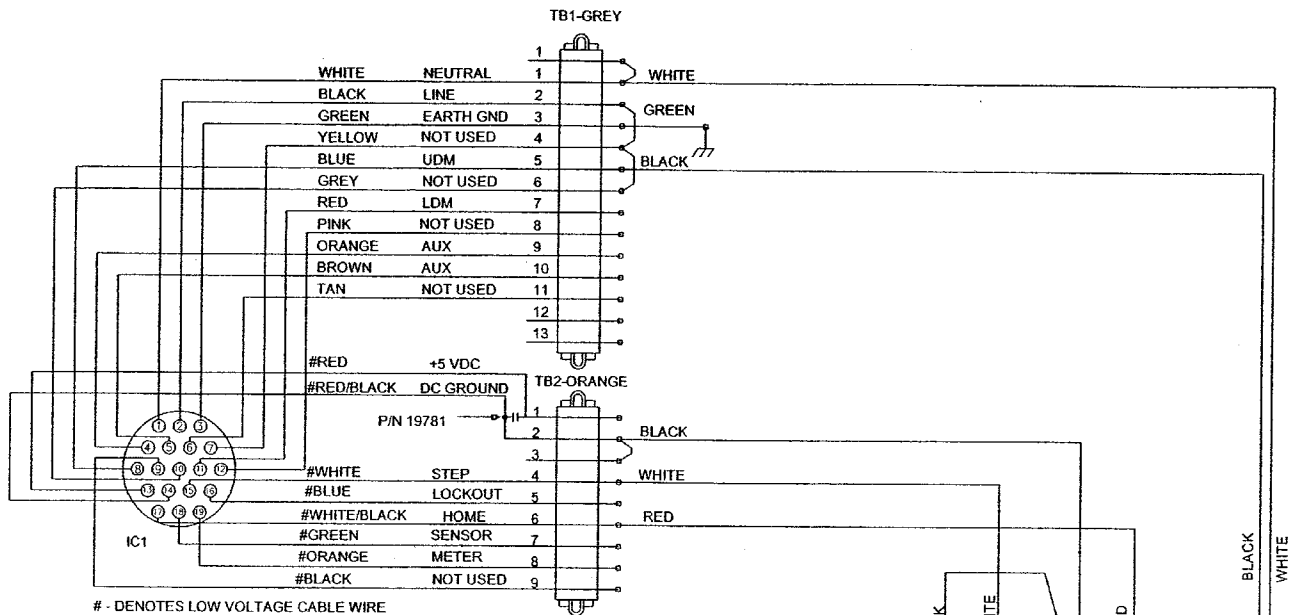
TB1 - HIGH VOLTAGE 14 POSITION TERMINAL BLOCK  
 TB2 - LOW VOLTAGE 9 POSITION TERMINAL BLOCK  
 IC1 - INTERLOCK CABLE RECEPTACLE  
 UDM - UPPER DRIVE MOTOR  
 LDM - LOWER DRIVE MOTOR  
 AUX - AUXILIARY RELAY  
 HCAM - VALVE HOMING CAM  
 SCAM - VALVE STEP CAM  
 SW1 - VALVE HOMING SWITCH  
 SW2 - VALVE STEP SWITCH  
 LD SWITCH - LOWER DRIVE SWITCH

NOTE: -  
 VALVE SHOWN IN SERVICE POSITION.



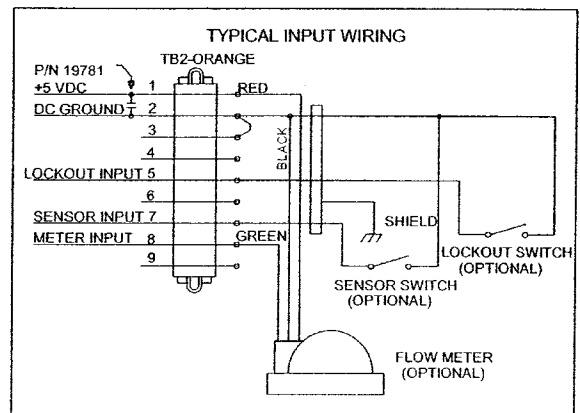
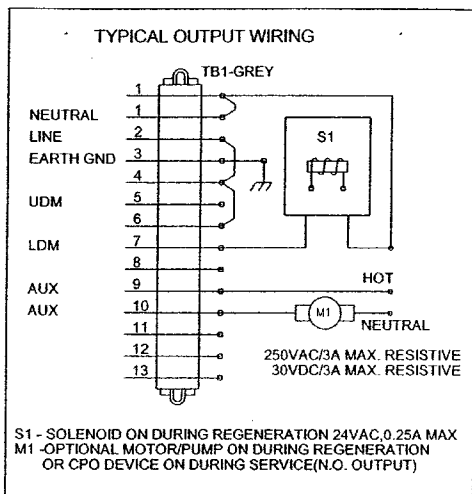
42074\_REVA

# 3150 - 3200NT Remote Wiring Diagram



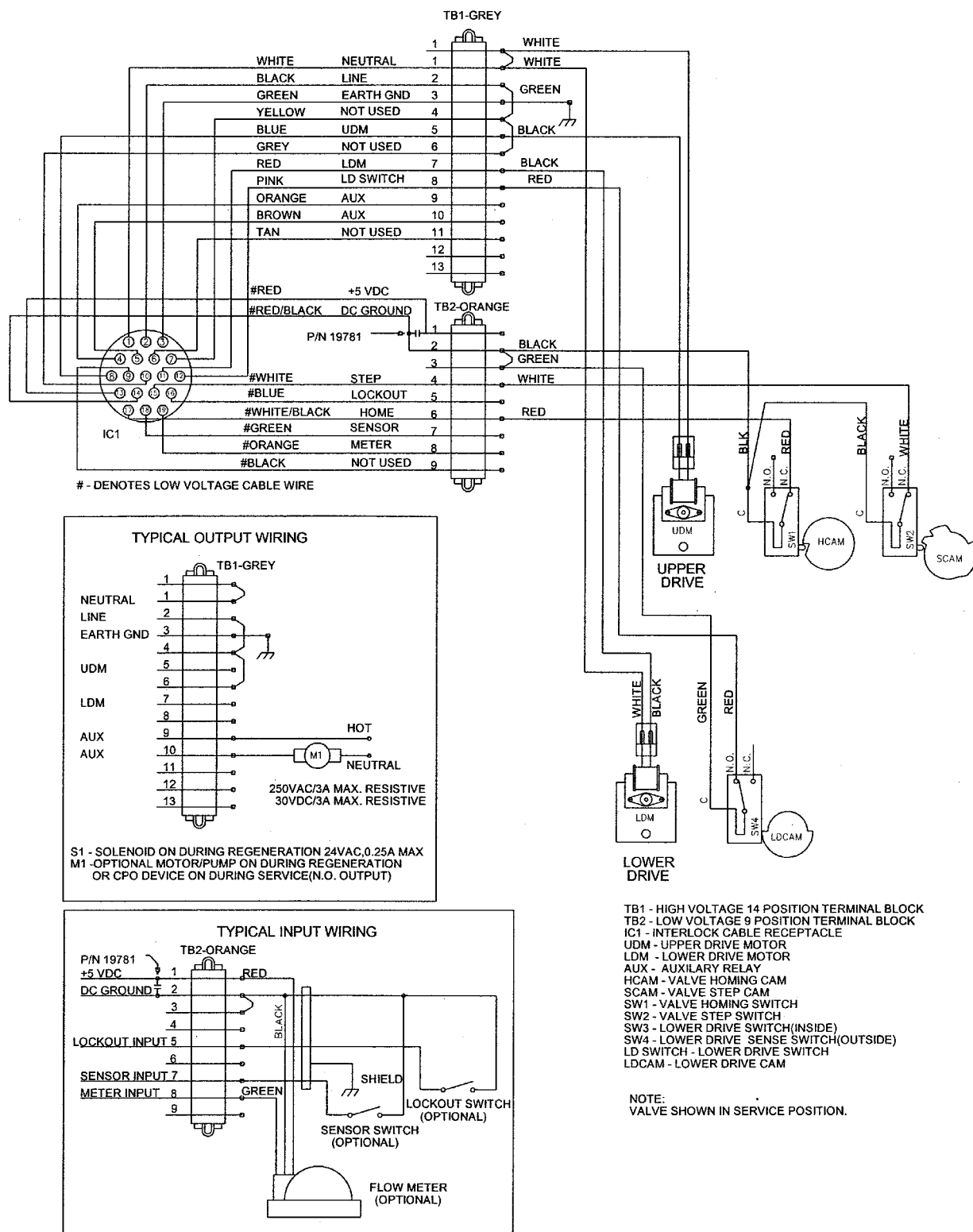
TB1 - HIGH VOLTAGE 14 POSITION TERMINAL BLOCK  
 TB2 - LOW VOLTAGE 9 POSITION TERMINAL BLOCK  
 IC1 - INTERLOCK CABLE RECEPTACLE  
 UDM - UPPER DRIVE MOTOR  
 LDM - LOWER DRIVE MOTOR  
 AUX - AUXILIARY RELAY  
 HCAM - VALVE HOMING CAM  
 SCAM - VALVE STEP CAM  
 BVCAM -  
 SW1 - VALVE HOMING SWITCH  
 SW2 - VALVE STEP SWITCH

NOTE:  
 VALVE SHOWN IN SERVICE POSITION.



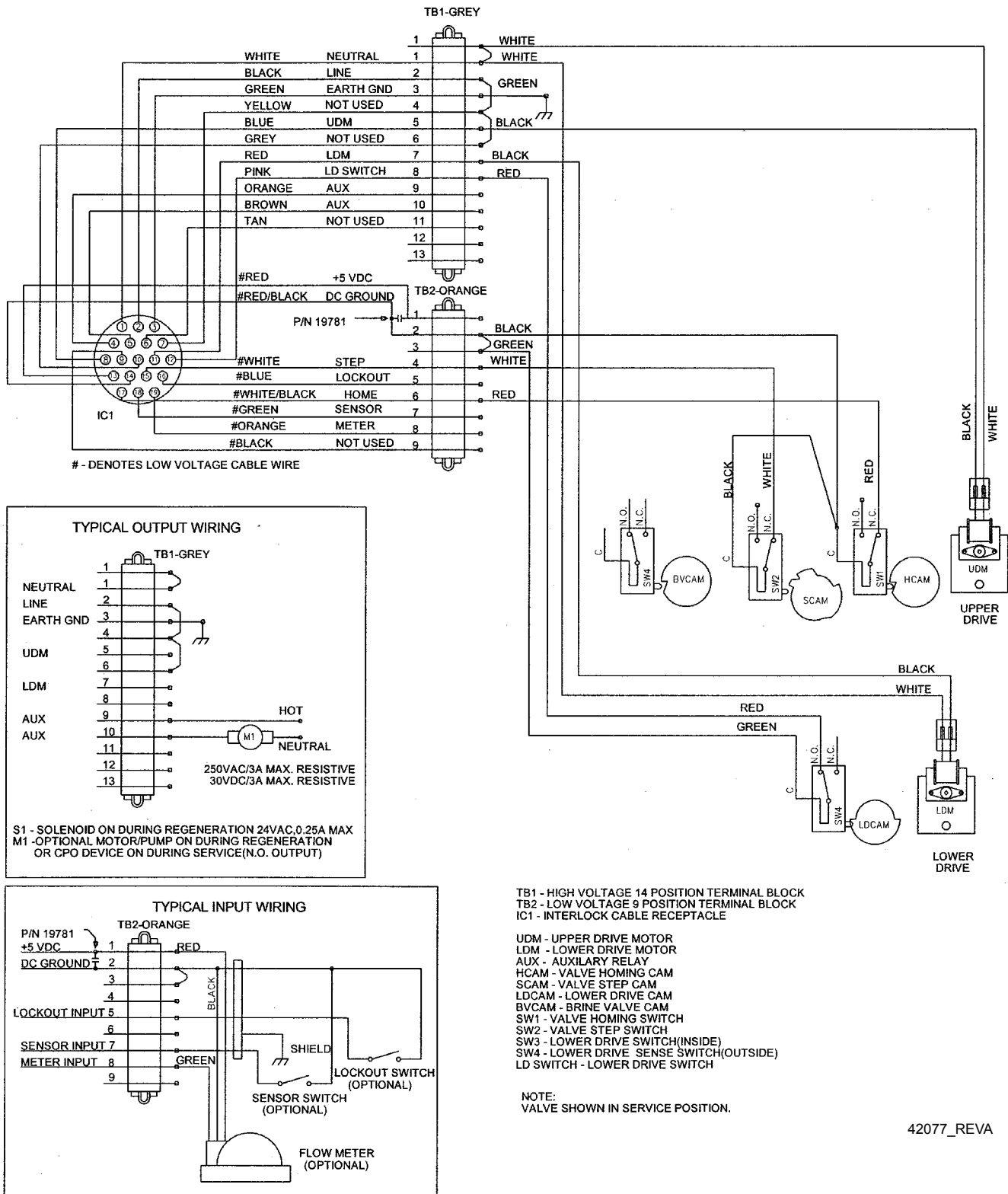
42076\_REVA

# 2900 - 3200NT Remote Wiring Diagram



42075\_REVA

# 3900 - 3200NT Remote Wiring Diagram

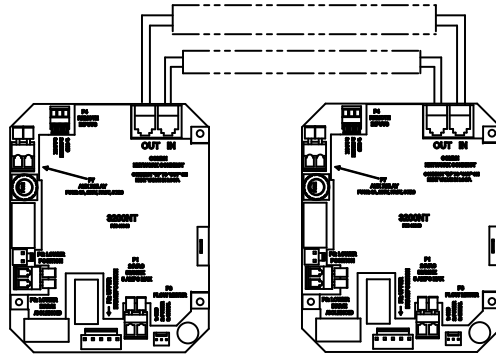


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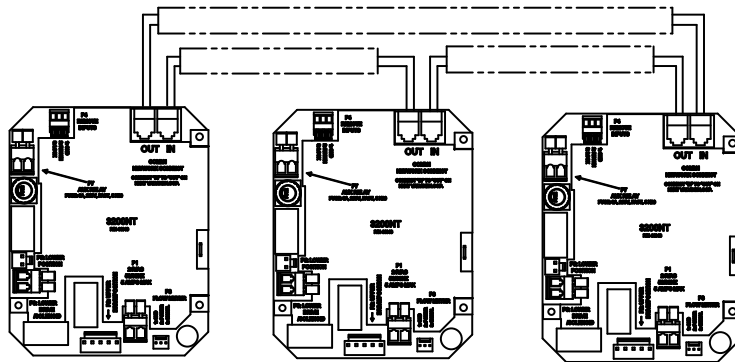
# Network Timer System Configuration Wiring Diagrams

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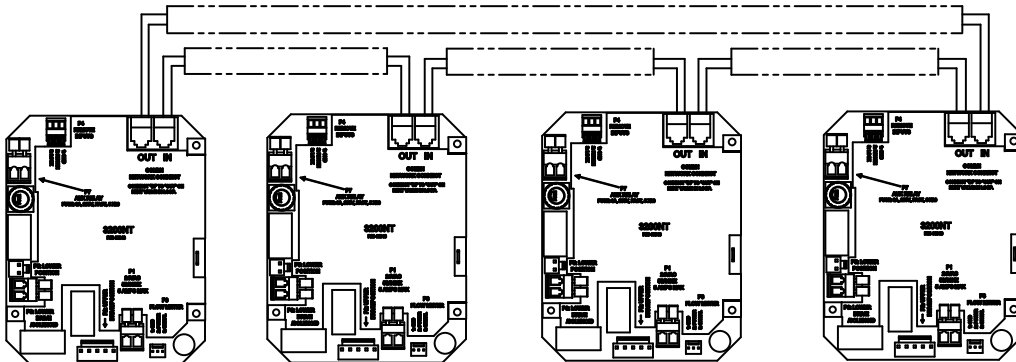
## Two Timers (for Systems 5, 6, 7 & 9 Duplex)



## Three Timers (for Systems 5, 6, & 9 Triplex)



## Four Timers (for Systems 5, 6, & 9 Quadplex)



40992\_REVC

### Interlocking 3200NT

**NOTE:** Use only 6-place, 4-conductor, RJ11 phone or extension cables.

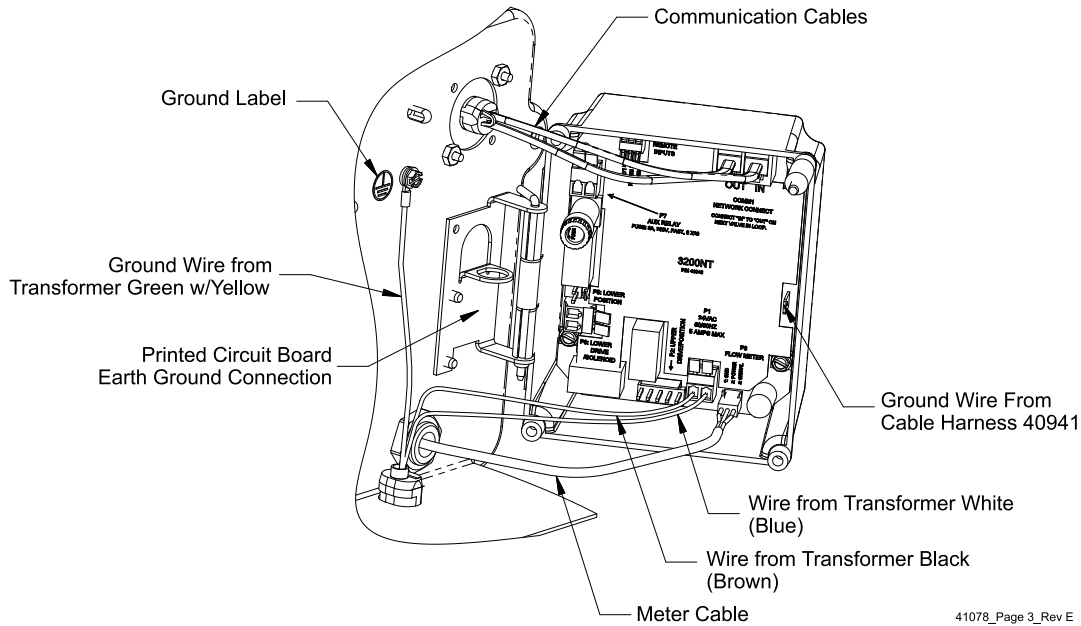
1. Connect phone or extension cables first before programming.
  - System Type 7 and 6: flow meter cable must be connected to the timer programmed as the LEAd Timer.
2. A maximum cable length of 100' cable can be used between timers.
3. Always connect "IN" communication port to the "OUT" communication port of the next timer. Connect the last timer back to the first timer.

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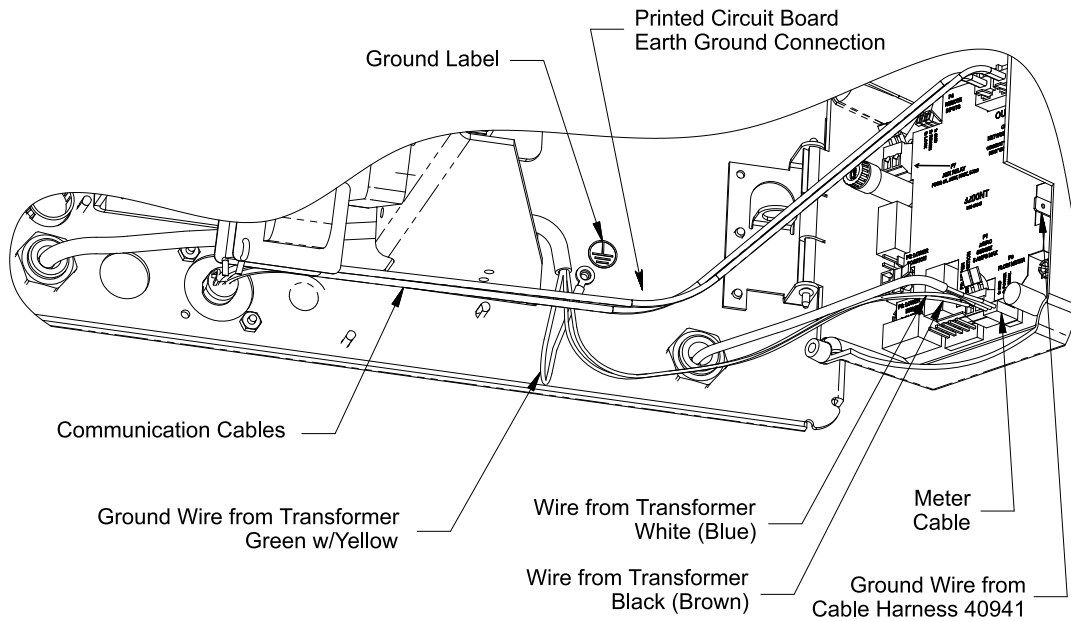
# Transformer, Phone Cable and Meter Cable Installation

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## Installing Ground Wire on Transformer (2750/2850/2900 Valves)



## Installing Ground Wire on Transformer (3150/3900 Valves)



## Installing and Grounding the Transformer

1. Locate the ground label to find ground screw.
2. Remove the screw and attach the transformer ground wire.
3. Re-attach the screw.

### Communication Error

If a communication error is detected, cErr displays. It may take several minutes for all of the units in a system to display the error message.

- All units In Service remain in the In Service position.
- All units in standby go to In Service.
- Any unit in regeneration when the error occurs completes regeneration and goes to In Service.
- No units are allowed to start a regeneration cycle while the error condition exists.
- When the communication problem is corrected and the error no longer displays (it may take several minutes for all of the units in a system to stop displaying the error message), the system returns to normal operation.

**NOTE:** During the error condition the control continues to monitor the flow meter and update the remaining volume. Once the error condition is corrected all units return to the operating status they were in prior to the error and regeneration is queued according to the normal system operation. If reprogramming the unit in the Master Programming Mode clears the error, the volume remaining may be reset to the full unit capacity (i.e. as though it were just regenerated).

**NOTE:** System 4 units retain their normal display and do not display cErr.

Cause	Correction
A. One or more units have a missing or bad communication cable.	A. Connecting the communication cables.
B. One or more units has a communication cable plugged into the wrong receptacle.	B. Connecting the communication cable as shown on the wiring diagrams.
C. One or more units is not powered.	C. Powering all units.
D. One or more of the units programmed as a stand alone system 4tc, 4FI or 4Fd and one or more units programmed as a multi-unit system 5FI, 6FI, 7FI or 9FI.	D. Programming the units for the same system type in the Master Programming Mode.
E. All of the units programmed as LAg. With no unit programmed as a LEAd (there is no unit to start the communications).	E. Programming the units correctly in the Master Programming Mode.

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# Troubleshooting

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## Programming Error

Timers display PErr when a programming error occurs.

- If multiple timers are programmed as LEAd, PErr displays on all units.
- If multiple timers are programmed with different system types, feed water hardness, regeneration day override and line frequency, a PErr will be displayed.
- All units In Service remain in the In Service position.
- All units in standby go to In Service.
- Any unit in regeneration when the error occurs completes regeneration and goes to In Service.
- No units are allowed to start a regeneration cycle while the error condition exists.
- When the problem is corrected and the error no longer displays (it may take several minutes for all of the units in a system to stop displaying the error message), the system returns to normal operation.

**NOTE:** During the error condition the control continues to monitor the flow meter and update the remaining capacity. Once the error condition is corrected all units return to the operating status they were in prior to the error and regeneration is queued according to the normal system operation. If reprogramming the unit in the Master Programming Mode clears the error, the volume remaining may be reset to the full unit capacity (i.e. as though it were just regenerated).

**NOTE:** System 4 units retain their normal display and do not display PErr.

Cause	Correction
A. One or more timers are programmed as System type different from the LEAd unit.	A. Programming the units correctly in the Master Programming Mode.
B. More than one timer is programmed as the LEAd unit.	B. Programming the units correctly in the Master Programming Mode.
C. One or more timers are programmed with different hardness, day override or line frequency values.	C. Program these values to be the same on all units.

## Simultaneous Communication and Programming Errors

If both a communication and programming errors occur simultaneously, the communications error (cErr) has precedence and masks the programming error (PErr). When the communications error (cErr) is corrected, the programming error (PErr) displays until corrected.

## Blank Display Screen

A blank display can occur when the controller is first turned on for the following reasons:

1. The controller is programmed as a 2900 or 3900  
AND
2. The controller is powered up on a unit without a lower drive  
OR
3. The connection to the lower drive is an open circuit (lower drive not connected properly)

### Solution:

1. Verify the lower drive is connected properly, then press the Extra Cycle button. When the display appears, program the controller to the correct valve type in Master Programming Mode.  
OR
2. Initiate a Master Reset (hold the Extra Cycle button while cycling power), then program the controller to the correct valve type in Master Programming Mode.





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## ***Notes***

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