

ILS MAX AUTOMATIC MODE

May 27, 2010



WHY AUTOMATIC MODE?

Automatic mode was created to eliminate the need for formula selectors on the washer, reduce programming time, and allow accurate triggering even when the washer trigger signals vary in length. These features allow:

- Simplified programming compared to relay mode, since you don't have to calculate a variety of different trigger lengths. Chemical volumes are programmed into the dispenser in ounces or millilitres.
- Eliminates the need for formula selectors, reducing your installation time and cost per washer.
- Reduces operator errors caused by selecting the wrong formula number or forgetting to change the formula selector.
- Increases dosing accuracy compared to relay mode, since relay mode determines the volume of chemical by the length of the washer signal. If the washer signal varies, so will the chemical volume that is dispensed.
- Data logging can be accomplished by either using an Automatic Formula Select (AFS) signal, or by load classification criteria.
- Automatic mode allows for easy formula chemical adjustment. Changes are made in the dispenser by simply changing programmed volumes in individual functions rather than changing the washer programming. This prevents production down time while the individual washers are reprogrammed.

WHAT IS AUTOMATIC MODE?

Automatic mode was originally designed to be used on chart machines. Since the length of signal time on a chart machine can not be accurately programmed, another method of programming the desired chemical feed volumes is required. A formula select module has traditionally been the default selection as it allows for different chemical formulas even without the ability to program signal time. However, this method relies on the operator to select both the proper chemical formula and machine formula. Mistakes can cause adverse results, such as damaged linen and poor or inconsistent results.

Relay mode uses a single trigger to call for a chemical and formulas mode uses a trigger to call for one or more chemicals. Automatic mode uses multiple triggers to create a product feed called a "function". The chemical volumes are entered in the dispenser by pump number and quantity (oz or ml). Up to three different pumps may be selected per function and each function may be used either in multiple formulas or in just one formula.

Functions are determined by binary-coding washer triggers. Although the length of signal time on a chart-controlled machine cannot be accurately controlled, it can be turned off and on by cutting the necessary tracks on the charts. Since it is nearly impossible to cut a chart so multiple requested triggers will activate at the same time, Automatic Strobed Mode was developed. This mode uses a strobe signal that must be cut into the chart approximately 15 seconds after the first chemical trigger is cut. This allows all the triggers to engage before reading which triggers are active. When the strobe has been activated for 5 seconds, the dispenser "reads" active signals and determines which function has been requested.

On microprocessor controlled washers, the triggers are programmed into the washer processor to turn on the required signals for the selected function. Three seconds after the first trigger activates, the dispenser looks for trigger signals, and the active triggers are "read", determining the requested function. The chart below shows the trigger patterns required to produce all 32 functions.

For example, if Ch2 on the TR7000E (T2) is activated by itself, Function 2 is requested. If Ch2 & Ch3 are activated, Function 4 is requested. When a function is requested, the pump(s) programmed for that function will deliver their programmed volumes.

You probably noticed Trigger 1 (T1) isn't used in the example above. T1 is reserved as a "strobe signal" for chart controlled machines. The triggering above is designed to be used on microprocessor controlled machines which do not require a strobe since the supply signals will typically activate nearly simultaneously. This mode is called "Automatic, Strobeless" and T1 is not required for triggering purposes. Although T1 is not programmed, the dispenser still waits 5 seconds after receiving the first chemical signal to "read" active triggers and will log a T1 trigger for each function. The T1 trigger count will need to be entered in the load classification chart if AFS is not used and load classification is determined by trigger and drain activity counts.

The chart below shows the signals for all 32 functions, with "----" indicating no signal.

Notes:

- Function 1 is available only in Automatic Strobed mode, since it is triggered by the strobe only and is ignored in Automatic Strobeless mode.
- Triggers must be activated for at least 5 seconds. Triggers activated for more than 2 seconds and less than 5 seconds will log as a trigger, but will not activate a function. These triggers that log without setting a function may be used to differentiate loads in the cycle classification table.
- While 32 functions are available per washer, most installations will not need that many. In Automatic, Strobeless Mode, machine trigger signals need to be activated simultaneously.
 - If you only have three triggers, you can use functions 2-8.
 - If you have only four triggers, you can use functions 2-16.
 - If you have five triggers, you can use 31 functions.
 - On machines with 5 signals that allow only 2 to be activated at a time (such as Milnor's EP Plus), 16 functions are available.
 - If you have 6 triggers you may use functions 2-32 + AFS to identify the load classifications.

| Function | T2 | T3 | T4 | T5 | T6 |
|----------|------|------|------|------|------|
| 1 | ---- | ---- | ---- | ---- | ---- |
| 2 | ON | ---- | ---- | ---- | ---- |
| 3 | ---- | ON | ---- | ---- | ---- |
| 4 | ON | ON | ---- | ---- | ---- |
| 5 | ---- | ---- | ON | ---- | ---- |
| 6 | ON | ---- | ON | ---- | ---- |
| 7 | ---- | ON | ON | ---- | ---- |
| 8 | ON | ON | ON | ---- | ---- |
| 9 | ---- | ---- | ---- | ON | ---- |
| 10 | ON | ---- | ---- | ON | ---- |
| 11 | ---- | ON | ---- | ON | ---- |
| 12 | ON | ON | ---- | ON | ---- |
| 13 | ---- | ---- | ON | ON | ---- |
| 14 | ON | ---- | ON | ON | ---- |
| 15 | ---- | ON | ON | ON | ---- |
| 16 | ON | ON | ON | ON | ---- |
| 17 | ---- | ---- | ---- | ---- | ON |
| 18 | ON | ---- | ---- | ---- | ON |
| 19 | ---- | ON | ---- | ---- | ON |
| 20 | ON | ON | ---- | ---- | ON |
| 21 | ---- | ---- | ON | ---- | ON |
| 22 | ON | ---- | ON | ---- | ON |
| 23 | ---- | ON | ON | ---- | ON |
| 24 | ON | ON | ON | ---- | ON |
| 25 | ---- | ---- | ---- | ON | ON |
| 26 | ON | ---- | ---- | ON | ON |
| 27 | ---- | ON | ---- | ON | ON |
| 28 | ON | ON | ---- | ON | ON |
| 29 | ---- | ---- | ON | ON | ON |
| 30 | ON | ---- | ON | ON | ON |
| 31 | ---- | ON | ON | ON | ON |
| 32 | ON | ON | ON | ON | ON |

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HOW TO USE AUTOMATIC MODE

This section takes you through the steps needed to set up automatic mode. The first step is the same as what you would do for formula or relay mode.

| STEP 1 MAKE A CHART OF YOUR FORMULAS | | | | |
|--------------------------------------|----------------------|------------------------------|------------|------------------------|
| Formula Name | Prewash | Main Wash | Bleach | Final Rinse |
| White Sheets | X | Alk 4 oz, Det 4 oz | Chlor 4 oz | Sour 2 oz |
| White Towels | X | Alk 6 oz, Det 5 oz | Chlor 6 oz | Sour 2 oz, Soft 2 oz |
| Blankets | X | Det 3 oz | X | Soft 2 oz |
| Hskpg Rags | X | Alk 6 oz, Det 5 oz | Chlor 6 oz | X |
| ool Towels | X | Alk 6 oz, Det 5 oz, Per 5 oz | X | Sour 2 oz, Soft 2 oz |
| Uniforms | X | Alk 4 oz, Det 4 oz, Per 3 oz | X | Sour 1.5 oz, Soft 2 oz |
| Eng Uniforms | X | Alk 8 oz, Det 5 oz, Per 8 oz | X | Sour 2 oz, Soft 2 oz |
| Kitchen Rags | Alk 20 oz, Det 12 oz | Alk 10 oz, Det 6 oz | Chlor 8 oz | Sour 2 oz |

Step 2 MAKE SIMILAR DOSE SIZES THE SAME FOR EASY PROGRAMMING

For example, dose sizes within 0.5 oz might be consolidated to one size and one function.

In the chart below, if some doses were 1.5 oz and another is 2 oz, then you might consolidate into one dose at 2 oz.

| STEP 3 MAKE A CHART OF FUNCTION DOSES | | | |
|---------------------------------------|-------------|-----------|----------|
| Function # | Dose 1 | Dose 2 | Dose 3 |
| 2 | Alk 4 oz | Det 4 oz | |
| 3 | Chlor 4 oz | | |
| 4 | Sour 2 oz | | |
| 5 | Alk 6 oz | Det 5 oz | |
| 6 | Chlor 6 oz | | |
| 7 | Sour 2 oz | Soft 2 oz | |
| 8 | Det 3 oz | | |
| 9 | Soft 2 oz | | |
| 10 | Alk 6 oz | Det 5 oz | Per 5 oz |
| 11 | Alk 4 oz | Det 4 oz | Per 3 oz |
| 12 | Sour 1.5 oz | Soft 2 oz | |
| 13 | Alk 8 oz | Det 5 oz | Per 8 oz |
| 14 | Perox 8 oz | | |
| 15 | Alk 20 oz | Det 12 oz | |
| 16 | Alk 10 oz | Det 6 oz | |
| 17 | Chlor 8 oz | | |

The chart of function doses is really just a list of the various chemical combinations used in all the formulas. Some, such as function 2 and 5, can be characterized as “wash light soil” and “wash medium soil”, and they could then be used across multiple formulas. Function 7, sour and softener, would similarly be used on multiple formulas.

| STEP 4 MAKE A CHART SHOWING WHICH FUNCTIONS GO WITH WHICH FORMULAS | | | | |
|--|---------|-----------|--------|-------------|
| Formula Name | Prewash | Main Wash | Bleach | Final Rinse |
| White Sheets | X | F2 | F3 | F4 |
| White Towels | X | F5 | F6 | F7 |
| Blankets | X | F8 | X | F9 |
| Hskpg Rags | X | F5 | F6 | X |
| Pool Towels | X | F10 | X | F7 |
| Uniforms | X | F11 | X | F12 |
| Eng Uniforms | X | F13 | X | F7 |
| Kitchen Rags | F15 | F16 | F17 | F4 |

All we've had to do in the step above is jot down the function numbers assigned to the chemical groups required, from our original formula sheet in yellow. Last, we look at which triggers need to be turned on to call these functions. By writing it down in chart form, it makes programming the washer faster.

| STEP 5 MAKE A CHART SHOWING WHICH TRIGGERS GO WITH WHICH FORMULAS | | | | |
|---|------------|------------|----------------|-------------|
| Formula Name | Prewash | Main Wash | Bleach | Final Rinse |
| White Sheets | X | T2 | T3 | T2, T3 |
| White Towels | X | T4 | T2, T4 | T3, T4 |
| Blankets | X | T2, T3, T4 | X | T5 |
| Hskpg Rags | X | T4 | T2, T4 | X |
| Pool Towels | X | T2, T5 | X | T3, T4 |
| Uniforms | X | T3, T5 | X | T2, T3, T5 |
| Eng Uniforms | X | T4, T5 | X | T3, T4 |
| Kitchen Rags | T2, T4, T5 | T3, T4, T5 | T2, T3, T4, T5 | T2, T3 |

DATA LOGGING IN AUTOMATIC MODE

Automatic mode data logging is the same as other modes. Chemical usage is logged based on pump runtime and calibration rates. Formula counts are logged based on selected formulas by either a FS1600 formula selector, an AFS (Auto Formula Select) signal, or by programming load classification information. Automatic mode, like relay mode, assumes there is not a formula selector installed, so for convenience, we will discuss the latter two options here. All data logging of cycles requires a valid "Machine On" signal. The dispenser needs to know when a cycle starts and when it ends. No cycles will be logged without some form of an end cycle signal.

1. AFS

To use AFS, you need to attach a trigger from the washer to the T7 input on TR7000E trigger module number 2. This trigger input is the same trigger used for AFS in formula or enhanced relay mode. In regular relay mode, TR7000E trigger module #3 T6 is used. The AFS signal on-time will then determine the formula logged using the formula: $4 \times \text{formula number} + 2 = \text{seconds of on time}$. See the chart below.

| Formula # | T7 Ontime Required | Signal Ontime Accuracy |
|-----------|--|------------------------|
| 1 | 6 seconds | +/- 0.5 seconds |
| 2 | 10 seconds | +/- 0.5 seconds |
| 3 | 14 seconds | +/- 0.5 seconds |
| 4 | 18 seconds | +/- 0.5 seconds |
| 5 | 22 seconds | +/- 0.5 seconds |
| 6 | 26 seconds | +/- 0.5 seconds |
| ↓ | Continued program times to formula 30 max on time of 122 sec | |
| 30 | 122 seconds | +/- 0.5 seconds |

AFS is easier to understand and set up than load classification setups. However, because AFS requires an additional trigger, and requires a trigger accuracy variance of less than 0.5 seconds, it may not be suitable for all installations. AFS identifies loads up to formula number 30 for data tracking purposes.

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2. Load Classification Setups

This method allows the system to categorize loads by formula number, based on drain count and trigger signals 1-5 that were present during the cycle that was run. In the Step 5 pink chart above, we see the trigger counts that would be programmed, along with the number of drains. The trigger and drain information would be entered into the Load Classification chart as shown in the graphic below.

Note: Drain count is only available if you are monitoring water fills on trigger module one. Drains will not be logged if the dispenser does not log a water fill between the closing and opening of a drain action.

Therefore, if a drain count is entered but no valid drains are logged, all loads will be logged as unidentified so the drain column entries must be set to zero.

| # | Classification | Run Time | Drain Count | Trig 1 Count | Trig 2 Count | Trig 3 Count | Trig 4 Count | Trig 5 Count | Weight |
|----|----------------|----------|-------------|--------------|--------------|--------------|--------------|--------------|--------|
| 1 | White Sheets | 38 | 0 | 3 | 2 | 2 | 0 | 0 | 90 |
| 2 | White Towels | 42 | 0 | 3 | 1 | 2 | 3 | 0 | 100 |
| 3 | Blankets | 30 | 0 | 2 | 1 | 1 | 1 | 1 | 85 |
| 4 | Hskpg Rags | 48 | 0 | 2 | 1 | 0 | 2 | 0 | 110 |
| 5 | Pool Towels | 48 | 0 | 2 | 1 | 1 | 1 | 1 | 100 |
| 6 | Uniforms | 39 | 0 | 2 | 1 | 2 | 0 | 2 | 90 |
| 7 | Eng Uniforms | 46 | 0 | 2 | 0 | 1 | 2 | 1 | 90 |
| 8 | Kitchen Rags | 65 | 0 | 4 | 3 | 3 | 3 | 3 | 125 |
| 9 | Cycle Name 09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | Cycle Name 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | Cycle Name 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Only drain and trigger signal counts are used in load identification; weight is used for generating cost/lbs or cost/kg data. Run time is used to log excess runtime (difference between programmed run time and actual run time) and turnaround time (time between loads). Note T6 is not used for load classification setups.

In our load classification example above, the trigger & drain counts need to be unique for each formula in order for the system to identify and track loads. In the automatic mode programming example shown in the chart above, cycles 3 and 5 have the same trigger counts. If drain counts were being utilized, they could differentiate the loads. If drain counts are not being utilized, as in the chart above, or they have the same drains as well, our load classification setups would have no way to differentiate between them and would log both loads under the first matching load ID on the chart. Therefore, all cycle 3 and cycle 5 loads would log as cycle 3.

There are a few options to correct this logging issue. The first option would be to use a different function with the same chemical doses to change the total trigger counts. The second method would be to activate one of the triggers, T2-T5 for 2 to 4 seconds anywhere during the wash cycle. If the trigger is on over 2 seconds, the dispenser will acknowledge the trigger, but will not trigger a function if it is less than 5 seconds. This will provide extra trigger signals to create a unique trigger pattern. See the chart below.

| CREATING A UNIQUE CYCLE IDENTIFYING TRIGGER PATTERN AUTOMATIC STROBED MODE | | | | |
|--|------------------|------------|----------------|-------------|
| Formula Name | Prewash | Main Wash | Bleach | Final Rinse |
| White Sheets | X | T2 | T3 | T2, T3 |
| White Towels | X | T4 | T2, T4 | T3, T4 |
| Blankets | X | T2, T3, T4 | X | T5 |
| Hskpg Rags | X | T4 | T2, T4 | X |
| Pool Towels | T2 (2-4 seconds) | T2, T5 | X | T3, T4 |
| Uniforms | X | T3, T5 | X | T2, T3, T5 |
| Eng Uniforms | X | T4, T5 | X | T3, T4 |
| Kitchen Rags | T2, T4, T5 | T3, T4, T5 | T2, T3, T4, T5 | T2, T3 |

By adding the short T2 trigger on cycle 5, the total trigger pattern changes, creating a unique cycle identifier for cycle 5. This can be done with any trigger T2-T5 as many times as necessary to insure unique cycle identifiers. They can be programmed anywhere in the wash cycle, even in a rinse.

| # | Classification | Run Time | Drain Count | Trig 1 Count | Trig 2 Count | Trig 3 Count | Trig 4 Count | Trig 5 Count | Weight |
|----|----------------|----------|-------------|--------------|--------------|--------------|--------------|--------------|--------|
| 1 | White Sheets | 38 | 0 | 3 | 2 | 2 | 0 | 0 | 90 |
| 2 | White Towels | 42 | 0 | 3 | 1 | 2 | 3 | 0 | 100 |
| 3 | Blankets | 30 | 0 | 2 | 1 | 1 | 1 | 1 | 85 |
| 4 | Hskpg Rags | 48 | 0 | 2 | 1 | 0 | 2 | 0 | 110 |
| 5 | Pool Towels | 48 | 0 | 2 | 2 | 1 | 1 | 1 | 100 |
| 6 | Uniforms | 39 | 0 | 2 | 1 | 2 | 0 | 2 | 90 |
| 7 | Eng Uniforms | 46 | 0 | 2 | 0 | 1 | 2 | 1 | 90 |
| 8 | Kitchen Rags | 65 | 0 | 4 | 3 | 3 | 3 | 3 | 125 |
| 9 | Cycle Name 09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | Cycle Name 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11 | Cycle Name 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

If you're in automatic strobed mode as on an older chart controlled machine, T1 will be used with every function, so each function will have T1 occur with it. T1 activated by itself will initiate Function 1 and would not be a good selection to use as a differentiation trigger unless it has no chemical doses programmed. In this case, we can have T2 act as our differentiating trigger. As long as it doesn't occur with T1, it will be ignored since it won't call for a function without the strobe in strobe mode. See the grey chart below.

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| CREATING A UNIQUE CYCLE IDENTIFYING TRIGGER PATTERN AUTOMATIC STROBED MODE | | | | |
|--|------------|------------|----------------|-------------|
| Formula Name | Prewash | Main Wash | Bleach | Final Rinse |
| White Sheets | X | T2 | T3 | T2, T3 |
| White Towels | X | T4 | T2, T4 | T3, T4 |
| Blankets | X | T2, T3, T4 | X | T5 |
| Hskpg Rags | X | T4 | T2, T4 | X |
| Pool Towels | T2 | T2, T5 | X | T3, T4 |
| Uniforms | X | T3, T5 | X | T2, T3, T5 |
| Eng Uniforms | X | T4, T5 | X | T3, T4 |
| Kitchen Rags | T2, T4, T5 | T3, T4, T5 | T2, T3, T4, T5 | T2, T3 |

In order to log average cost per hundred weight on unidentified loads, a weight value must be entered into cycle 30 on the Load Classification Chart. Without a weight in cycle 30, load cost totals will be the only information available as the dispenser will not have the ability to calculate average costs.

TROUBLESHOOTING LOAD CLASSIFICATION SETUPS

Generally, load classification logging is reliable with newer washers. With older chart controlled washers, flickering triggers can occur, resulting in the load not matching the logged criteria. This will cause it to be logged as an "Unidentified Load". Another issue is when the washer is stopped mid-cycle for some reason and then restarted by the operator. The dispenser will see this as two short loads logged under "Unidentified Load".

To troubleshoot Unidentified Load records, the easiest tool to use is the Cycle Records Report. As shown below, it shows how many triggers and drains occurred, and you can then match this up against your programmed load classification setups to see if the drains or triggers were counted and programmed incorrectly.

| Cycle Records | | | | | | | | |
|--|----------|----------|--------|-----------|-----------|-----------|-----------|-----------|
| File Record Communicate | | | | | | | | |
| Dispenser # 01 Record | | | | | | | | |
| Sample DF2 Site | | | | | | | | |
| Date | Time | Washer # | Drains | Trigger 1 | Trigger 2 | Trigger 3 | Trigger 4 | Trigger 5 |
| 02-Jan-1999 | 06:19 AM | 1 | 7 | 1 | 2 | 1 | 1 | 0 |
| 02-Jan-1999 | 06:46 AM | 2 | 13 | 2 | 2 | 0 | 0 | 0 |
| 02-Jan-1999 | 06:47 AM | 3 | 8 | 1 | 1 | 1 | 1 | 0 |
| 02-Jan-1999 | 07:28 AM | 1 | 11 | 1 | 1 | 1 | 1 | 0 |
| 02-Jan-1999 | 07:45 AM | 2 | 6 | 1 | 1 | 0 | 1 | 0 |
| 02-Jan-1999 | 08:24 AM | 3 | 10 | 2 | 2 | 1 | 1 | 0 |
| 02-Jan-1999 | 08:34 AM | 2 | 11 | 2 | 2 | 1 | 1 | 0 |
| 02-Jan-1999 | 08:39 AM | 1 | 4 | 0 | 1 | 0 | 0 | 0 |
| 02-Jan-1999 | 09:21 AM | 1 | 4 | 0 | 1 | 0 | 0 | 0 |