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WEIGH SCALE DISPENSE
system

NOVEMBER 12, 1998

OPERATIONAL
SUPPLEMENT

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M A G U I R E P R O D U C T S , I N C .

WEIGH SCALE DISPENSE
SYSTEM

TABLE of CONTENTS

GETTING STARTED, READ THIS PAGE	Page 2
Confirm Software Setup	Page 3
Selecting Dispense Weight	Page 4
The Recipe File	Page 6
Entry of Recipes	Page 7
Special Star Functions	Page 8
Operation	Page 8
Dispense System Overview / Models	Page 9
Cycle Start / Cycle Complete Signals	Page 10
Parameter Table Changes	Page 11
Percentage Settings	Page 14

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GETTING STARTED, READ THIS PAGE.

This "DISPENSE" booklet provides SUPPLEMENTAL INFORMATION only about your DISPENSE system.

The other manual, the WEIGH SCALE BLENDER OPERATION MANUAL, is the primary source of information about the equipment, controller, and software.

Pages 3 through 10 of the BLENDER manual, followed by pages 3 through 7 of this SUPPLEMENTAL manual, WILL GUIDE YOU, STEP BY STEP, TO A SUCCESSFUL STARTUP.

IT WON'T TAKE LONG; SO.... PLEASE, DON'T SKIP AHEAD.

FIRST... in the BLENDER MANUAL, read:

SAFETY HAZARD: ONE HAZARD exists: SLIDE VALVES.
Page 3 Read this page so no one gets hurt.

ASSEMBLY INSTRUCTIONS: Very little assembly is required. But you Page
4 might as well get it right the first time.
ALSO: Pay attention to the section on WIRING.

CHECK OUT PROCEDURE: This is to see if you did it right. It also
Page 7 will tell if anything was damaged in shipping.

LOAD CELL CALIBRATION: We have already done this. But rough handling
Page 10 during shipping can create load cell problems.
If weight readings are not correct, you MUST
recalibrate the load cells.

THEN.... return to this manual for:

CONFIRM SOFTWARE SETUP: This should already be done. You should
confirm that it is.

SELECTING DISPENSE WEIGHT: There are three ways:
Direct entry of single dispense weight,
Recipe selected single weight,
Recipe selected series of weights.

NORMAL OPERATION: as a DISPENSE system.

```
+-----+
| PROCEED TO: THE BLENDER INSTRUCTION MANUAL PAGE 3 |
+-----+
```

After page 10 of that manual
return to this manual,

```
+-----+
| PROCEED TO: CONFIRM SOFTWARE SETUP Next Page |
+-----+
```

CONFIRM SOFTWARE SETUP

Accuracy is the primary goal of a dispense system. To accomplish this TWO dispenses are made, the FIRST targeting 90 percent of the total, the SECOND programed to make up the difference.

When set up properly, standard DISPENSE SYSTEMS have components 1 and 2 "turned on" with settings of (90.0) for component 1, and (100) for component 2.

NOTE: To understand how components are "turned on" and how settings effect the math of each dispense, read the TWELVE SOFTWARE INSTRUCTION MANUAL, "Setting TYPES".

To CONFIRM that your unit is set up properly:

Press: SET Display should say (1 R 090)
Press: SET Display should say (2 N 100)

Repeatedly pressing the SET key should repeat the above sequence.

Press: EXIT to exit this routine.

If your unit DOES NOT show these entries:

1. See page 14 of this manual and page 13 of the BLENDER manual for the proper procedure to make these entries.
2. See page 11 of this manual for the list of parameter changes that you need for your system to work correctly.

```
+-----+  
| PROCEED TO:    SELECTING DISPENSE WEIGHT    Next Page |  
+-----+
```

SELECTING DISPENSE WEIGHT

Dispense weight is determined by a 3 digit number, 00.1 to 99.9.

A function is available to shift the decimal point allowing the range of weights to be 001 to 999 (pounds or kilos). See page 8 (*48).

The capacity of the weigh bin is determined by the MAX parameter which is set to 3000 grams for model 220, and 13,500 grams for model 920.

If you request a dispense weight that exceeds this MAX weight, the unit will automatically make multiple dispenses until the requested weight is dispensed.

Three modes of selecting the dispense weight are available:

1. DIRECT ENTRY of a SINGLE dispense weight, using the TOP thumbwheel switches.
2. RECIPE selection of SINGLE weights, retrieved from the recipe file, using the MIDDLE switches for recipe selection.
3. RECIPE selection of a SERIES of dispense weights, retrieved from the recipe file, using the MIDDLE switches for recipe series selection.

Note: the MIDDLE switch entry will override the TOP switch entry.

DIRECT ENTRY:

This is the simplest mode. SINGLE dispense weights can be specified using the TOP thumbwheel switches for direct entry of the weight.

You simply enter the weight you want from 00.1 to 99.9 pounds.

For example: For a dispense of 5.6 pounds, enter (05.6).
For a dispense of 10 pounds, enter (10.0).

RECIPE retrieval of a SINGLE weight:

SINGLE dispense weights may be called up from the recipe file using the MIDDLE thumbwheel switches to specify a recipe number. Up to 99 single weight selections may be retrieved in this way. Enter the recipe number on the MIDDLE switches, 001 to 099.

For example: To retrieve the weight stored in recipe 11, enter (011).

Note: If the MIDDLE switch is set, the TOP switch is ignored.

RECIPE retrieval of a SERIES of WEIGHTS:

In this mode, a series of different weights may be retrieved in their order of entry and dispensed consecutively. The series will automatically repeat over and over. The MIDDLE thumbwheel switches specify the starting point in the recipe file.

Up to 99 different groups or sequences may be stored, with no limit on the number of weights in any single sequence, except that an overall limit of about 1000 weights can be stored.

Enter the recipe file start point on the MIDDLE switches.

A nine must be entered as the first digit of the thumbwheel switch setting (9xx) to signal the unit to retrieve a series of weights rather than just a single weight.
Enter a thumbwheel switch number from 901 to 999.

An entry of "999" in the recipe file is necessary to mark the end of each series of weights.

For example: To retrieve a series of weights that start at recipe location 16, enter (916). At the end of this series a retrieval of "999" will occur to signal the end of the series and to pass control back to the start point.

POWER OFF will always reset a recipe sequence back to its beginning point.

REMEMBER:

The TOP set of thumbwheel switches indicate a WEIGHT for DIRECT entry of a dispense weight.

The SECOND set of switches indicate a RECIPE number for retrieval of a single weight or a series of weights from the recipe file.

If the MIDDLE switch is set, the TOP switch is ignored.

When no RECIPE number is set, entry is (000), control reverts back to the TOP switches which are then read as a direct weight.

NOTE:

The recipe function will not operate until this function is turned on and entries are made. This is explained next.

```
+-----+
|   PROCEED TO:   RECIPE FILE       Next Page.   |
+-----+
```

RECIPE FILE:

RECIPE number ENTRY is explained on the NEXT PAGE. Before making entries, read the following example of how they are handled.

Example:

Recipe file, recipes 01 to 99:

```
<----- Up to 12 entries per recipe number. ----->
+-----+
1 |100 |035 |225 |999 |   |   |   |   |   |   |   |   |   |   |
```

2												
3	025	051	240	330	120	220	110	030	065	020	200	200
4	165	185	063	999								
5												
6	105	108		040	133							
7	200	222	010	999								
8												
9												

and so on up to:

99												
----	--	--	--	--	--	--	--	--	--	--	--	--

Requesting recipe 001 brings only one weight; 10.0 pounds.

Requesting recipe 901 brings up three weights. The first dispense will be 10.0 pounds, the next will be 03.5 pounds, the third 22.5 pounds. "999" ends the sequence which means the fourth dispense will start the sequence over again at 10.0 pounds.

Requesting recipe 002 or 902 runs nothing since recipe 2 starts with a zero or blank entry. No recipe is run. No dispenses occur.

Requesting recipe 003 brings up one weight; 02.5 pounds.

Requesting recipe 903 runs a sequence of 15 weights, starting with 2.5 pounds and ending with 6.3. Notice the sequence does not stop after 12 entries, but continues until "999" is encountered.

Requesting recipe 006 brings up one weight; 10.5 pounds.

Requesting recipe 906 runs a sequence starting with 10.5 and ending with 1.0. A total of 7 different weights are dispensed before being repeated. Blank fields or fields with 000 are skipped. Only the "999" stops the forward scan and returns the selection to the starting point.

ENTRY of RECIPES

To use the RECIPE features, follow the procedures outlined here to make all entries and changes to the recipe file.

You must first be in the PROGRAM mode:

```

Press: *           Display will say: (PASSWORD)
Press: 22222      Display will say: (P x.x)

```

If pressing the RECIPE (RCP) key brings up a display of (INVALID), then the RECIPE key must be enabled in the FLG parameter.

To do so:

Press: PARA Display will say: (FLG 00000)
Press: 00100 Display will say: (FLG 00100)
Press: EXIT Display will say: (P x.x)

To view, enter, or change a RECIPE:

Press: RCP Display will say: (01 EMPTY)

We call this display the recipe "ID and status" or "title".
If data resides in recipe 01, the title will say: (01 DATA).

Press: RCP repeatedly to scan forward through all 99 recipes.
OR: ENTER a two digit recipe number to jump to the recipe
 you want.

When the recipe "title" you want is displayed:

Press: * Display will say: (01-1=000)
 This is recipe 1, component 1, setting of 000.
Press: * Display will say: (01-2=000)
Press: * repeatedly to scan forward through the entries.

At any point,

Enter: The correct dispense weight you wish to store.
 For example; if the dispense is to be 18.5 pounds,
 enter 185.

Press: "CE" to clear any entry to 000.

ALWAYS:

Enter: 999 to indicate the end of a series.
Press: EXIT when done

To retrieve only SINGLE weights from the recipe file, enter these weights only in position 1 of each recipe string. Position 1 entries are the only recipe entries that can be retrieved singly.

To retrieve a SERIES of weights, always START the series in position 1 of a recipe string and end the series with the entry of 999.

A series may exceed the 12 entries of a single recipe string. The system automatically scans forward through succeeding recipe strings until a "999" is encountered. It then returns to its start point.

A series may include blank or zero entries which will be skipped automatically.

SPECIAL STAR FUNCTIONS:

These functions are available in the PROGRAM mode only.

47 Press (,4,7) to alter the range of available dispense weights by a factor of ten. The system normally accepts entries from 00.1 to 99.9 pounds or kilos. This function alters this range so entries are now read as 001 to 999.

Press *47 and use the * key to toggle between a display of (MAX 99.9) and (MAX 999). When the range you want is displayed, press EXIT.

OPERATION

Turn power on.

Turn both STOP switches, on left side of controller, UP.

If recipe function is NOT being used:

Set the top thumbwheel switches to the weight you want.
Leave the middle switches set to 000.

If recipe function IS being used:

to select ONE recipe, set the middle switch to a single Recipe
number (001 to 099).

to scan a series of recipes; set the middle thumbwheel switch to 9
plus the starting recipe number (901 to 999).

to directly enter a weight, set the middle switches to 000; and set
the TOP thumbwheel switches to the weight you want.

Position the container under the dispense station.

Press and hold the START button long enough to start the process,
about 3 seconds.

MODEL WSD WEIGH SCALE DISPENSE SYSTEM OVERVIEW

MAGUIRE WEIGH SCALE DISPENSE systems are designed to meet the needs of the ROTATIONAL MOLDING industry where obtaining pre-weighed batches of material is an important part of the process.

These systems allow you to dispense pre-selected weights ranging from 00.1 to 99.9 pounds or kilos, or optionally, from 1 to 999 pounds or kilos.

EQUIPMENT CONFIGURATION

MAGUIRE model WSD DISPENSE systems are very similar to our Weigh Scale Blenders. All mechanical components are the same except the mix

chamber is removed and replaced with a funnel to divert all material out the bottom.

The controller is identical, with certain parameters changed to meet the special requirements of a DISPENSE station. In other words, Weigh Scale Blenders and Weigh Scale Dispense stations share the same controller and same software. A few simple entries using the keypad change the function of the controller from one unit to the other.

Since material is not held in a mix chamber, the high level sensor normally provided on a blender is not present. A push button replaces the sensor to start the dispense cycle. Any other type of external contact closure may be substituted for this push button.

MODELS:

Two systems are offered as standard:

- | | |
|---------|--|
| WSD 220 | * 420 frame. |
| | * 3 K load cells. |
| | * 4 K weigh bin. (holds about 5 pounds at 20 #/cu ft) |
| | * Qty. 2 - 3" round valves for 1st. and 2nd dispense. |
| | * Optional flow restrictor on 2nd dispense valve. |
| | * Dispense hopper, single compartment. |
| | * |
| | * 12 software - DISPENSE mode selected. |
| | * Sensor replaced with Push button to start cycle. |
| WSD 920 | * 940 frame, modified for 1800 weigh bin. |
| | * 10 K load cells. |
| | * 18 K weigh bin. (holds about 25 pounds @ 20 #/ft) |
| | * (2) 3"x 6" valves with 940 hopper, partitions removed. |
| | or 2"x 3" valves with 220 hopper, partition removed. |
| | * optional flow restrictor on 2nd dispense valve. |
| | * mix chamber replaced with fabricated funnel. |
| | * 12 software - DISPENSE mode selected. |
| | * Sensor replaced with Push button to start cycle. |

CYCLE START

Maguire Blenders begin the dispense cycle when a signal is received from a level sensor. Since DISPENSE systems don't require level sensors, we provide a START button that plugs into the "level sensor" receptacle on the right side of the controller. The system will then cycle when the button is pressed.

You may also wire this start signal to a relay contact that can provide the same start signal by automatic control.

The START signal must be a minimum of TWO SECONDS long.

CYCLE COMPLETE

If this system is part of an automated material delivery system, a "cycle complete" signal may be necessary. This is available through the MIX MOTOR output, on the right side of the controller.

All Maguire WSB controllers provide a 110 volt (or 230v) mix motor output normally used to drive a mixer motor. This signal is programmed to begin exactly when the weigh bin dump valve opens and dumping begins. The signal continues for 10 seconds. It is further programmed to jog the mix motor for one second every 30 seconds thereafter.

Dispense stations do not have mix motors, so this voltage output serves no purpose. However, this signal does provide an excellent way to signal the end of the cycle. Automated processes controlled by a PLC can use this signal.

This is a 110 volt (or 230v) signal. A relay will be required if you prefer a dry contact closure.

If you are going to use this output, the MIX parameter must be changed to eliminate the JOG signals that normally occur every 30 seconds. You must change this parameter from (MIX 03010) to (MIX 00010) so that NO jogs occur.

If the receiving container is to be moved away automatically, then, when the signal is detected, meaning the weigh bin has begun to empty, a delay of adequate duration should be programmed (at the PLC) so that the receiving container will remain in place long enough for the weigh bin to completely empty.

The MIX MOTOR switch must be down, in the TIMED position, for this signal to work as described.

If you require the signal to be shorter or longer than 10 seconds, you may change the MIX parameter to another number. Read more about the MIX parameter in the Instruction Manual.

PARAMETER TABLE

DISPENSE systems use TWELVE component software as a base.

To program this unit to properly operate as a DISPENSE system, we have already made a number of changes to the normal "default" numbers in the PARAMETER table stored in the controller's memory. These changes were entered through the keypad.

We explain them here because you may want to change them further.

The changes are as follows:

FLG 00100 Change from 00000 to 00100 ONLY if you plan to use the RECIPE function.

This flag enables the RECIPE key to function. This will allow the selection of a dispense weight or a series of weights from the recipe file.

MIX 00010 Change from 03010 to 00010 ONLY if you are automating your system for control from a PLC.

This parameter controls MIX time and JOG function. A PLC may use the MIXER signal to indicate the end of the dispense sequence. Changing 030 to 000 prevents the JOG function from operating.

DTI 00005 Change ONLY if you feel the time allowed to empty the weigh bin is too long.

This is the time, in SECONDS, that the weigh bin valve will open to empty the weigh bin. This time adds to overall cycle time so it should be short, but not too short.

BER 00000 ALWAYS change this parameter to 00000.

This is a "bailout" weight. A zero setting is the most sensitive. This ensures minimum overshooting of a dispense should such an error occur.

FUL 00001 ALWAYS change this parameter. This is the PRIMARY indication to the controller that this system is a DISPENSE system.

The options are:

FUL = 00001; read weight in pounds (xx.x).
FUL = 00002; read weight in kilos (xx.x).

These settings instruct the software to use the top row of switches for direct entry of the weight of the dispense or, if the RECIPE function is on (FLG=00100), then the 2nd thumbwheels will indicate the recipe where the correct weight will be found.

DLY 00000 ALWAYS change this parameter to 00000.

This keeps the time you must hold the start button as short as possible. A start signal must be held for a least two seconds while a valid tare weight is taken. DLY time (seconds) is then added to tare weight time. Since no added delay is desirable, we set this to 0.

MAX 13500 This parameter is set automatically according to model.

It signals the maximum weight the bin can safely hold without risk of overflowing. It is based on rotational molding powder, about 20 pounds per cu. ft.

When dispense weight you request exceeds the amount specified in the MAX parameter, the unit will automatically make multiple dispenses that will add up to

the requested amount. When multiple dispenses are made, each dispense is targeted at 2/3 of the MAX setting until the remainder is less than MAX.

The default values MAX=6000 for a model 220 and MAX=13500 for a model 920.

DS1 00000 These parameters override the top and middle thumbwheel
DS2 00000 switch settings. Use them if you are using MLAN.

If either DS1 or DS2 is set to any value greater than zero, DS1 will be substituted for the TOP switch settings, and DS2 for the MIDDLE switch settings.

These two parameters allow MLAN to download the dispense weight amount or recipe number. They also allow entry of a "locked in" amount or recipe.

If both are set to 00000, then nothing changes.

Note: The middle thumbwheel switch setting for a recipe will override the top switch setting. When using MLAN to load a weight into DS1, load 00000 into DS2 to be sure DS1 will control.

=====

All of these parameters are more thoroughly described in our WEIGH SCALE BLENDER INSTRUCTION MANUAL.

If you make changes, use the *23 function to save the new corrected information. The *23 function is described on a label on the controller.

CHANGING PARAMETERS

To change a PARAMETER, the sequence of keystrokes is as follows:

```
+-----+
| Press: *           Display will say: (PASSWORD) |
| Press: 22222       Display will say: (P x.x) |
| Press: PARA        Display will say: (FLGxxxxx) |
| Press: PARA        Press again to walk FORWARD through list. |
| Press: *           to BACK UP in the list. |
+-----+
```

When the PARAMETER you want is displayed, enter a new setting using the number keys. You must enter 5 digits. Use leading zeros.

Press: EXIT Display will say: (P x.x)

SAVING PARAMETERS in EEPROM

If the changes you have made are PERMANENT, SAVE them in EEPROM.

Sometimes during normal operation, electrical noise or RF (Radio

Frequency) noise will corrupt the processor memory. It may be necessary to do a CLEAR to fix this problem.

A "CLEAR" will clear all data from memory and replace it with information stored in the EEPROM.

So it is a good idea to have an exact copy of RAM stored in the EEPROM for just such an emergency.

To copy ALL PARAMETERS into the EEPROM, the sequence of keystrokes is as follows:

```
+-----+
| Be in PROGRAM mode, first 2 steps above:
|                                     Display will say:  (P   x.x)
|
| Press:  *           Display will say:  (INSTR --)
| Press:  23          Display will say:  (SAVING  )
| Wait:   when done, Display will say:  (P   x.x)
|
| Press:  EXIT        Display will say:  (   x.x)
+-----+
```

With this done, all correct Parameters may be restored from EEPROM to RAM at any time by doing a CLEAR.

To do a CLEAR, hold the "CE" key down when turning on power.

PERCENTAGE SETTINGS

Accuracy is the primary goal of a dispense system. To accomplish this, without sacrificing speed, we have found that TWO dispenses are best, the FIRST targeting 90 percent of the total, the SECOND programed to make up the difference.

"PERCENTAGE SETTINGS" are entered to tell the unit what to do.

Dispense systems use our "TWELVE" component software, which means up to twelve components could be controlled. But we use only two.

We have "turned on" components 1 and 2, setting component 1 to "REGRIND" and component 2 to "NATURAL". This instructs the software to handle the math the way we want; specifically "regrind" components are handled as a percentage of the batch weight, and "natural" components are programed to target just enough material to make up the short-fall from the first dispense.

The meaning of the designations "natural" and "regrind" will be clearer if you read our TWELVE SOFTWARE INSTRUCTION MANUAL, "Setting TYPES".

The settings that we enter are 90.0 (90 percent) for component 1, and 100 for component 2. (The value 100 has no significance) Again, this will be clearer if you read the INSTRUCTION MANUAL section on "Settings".

The first dispense, component 1, is 90 percent of requested amount.

The second dispense, component 2, fills the balance of the bin to full requested amount.

We already set the unit up properly and entered these settings.
The INSTRUCTION MANUAL covers the procedure for making these entries.