Lean Recipe Selector

Customer Product Manual
Part 1095072A
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Contact Us

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Lean Recipe Selector

Safety

Read and follow all safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate. Make sure all equipment documentation, including these instructions, is accessible to all persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed. All phases of equipment installation must comply with all federal, state, and local codes.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately. Disconnect and lock out electrical power. Close pneumatic shutoff valves and relieve pressures. Identify the reason for the malfunction and correct it before restarting the equipment.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

Description

The Lean Recipe Selector (LRS) is a PLC based part identification system that works with the Nordson iControl® Integrated Control System to automatically identify the preset number for parts of different sizes without having to flag every part. The LRS identifies up to 20 parts by their dimensions and associates each part with one of 5 different color groups or a recoat group. A default recipe is also provided for unidentified parts.

NOTE: The iControl system must have iControl software version 2.2.14.2 or higher installed. Parts must be no more than 120 encoder counts long.

The LRS consists of a PLC, power supply, and color touch screen, housed in a pedestal-mounted enclosure. The color touch screen is used to configure and operate the system. The LRS uses the iControl zone and part width sensors to identify a part and send a preset number to the iControl system. The iControl system then uses the preset parameters for gun triggering and powder coating.

System Operation

NOTE: For accurate part identification, the parts entering the part identification stand must be traveling on a flat, straight section of conveyor and the conveyor should not surge, making the parts sway, while the parts are passing by the sensors.

Figure 1 graphically describes system function. Refer to your iControl manuals for information about installation and configuration of the conveyor encoder, zone photoeyes or scanners, and analog scanners.

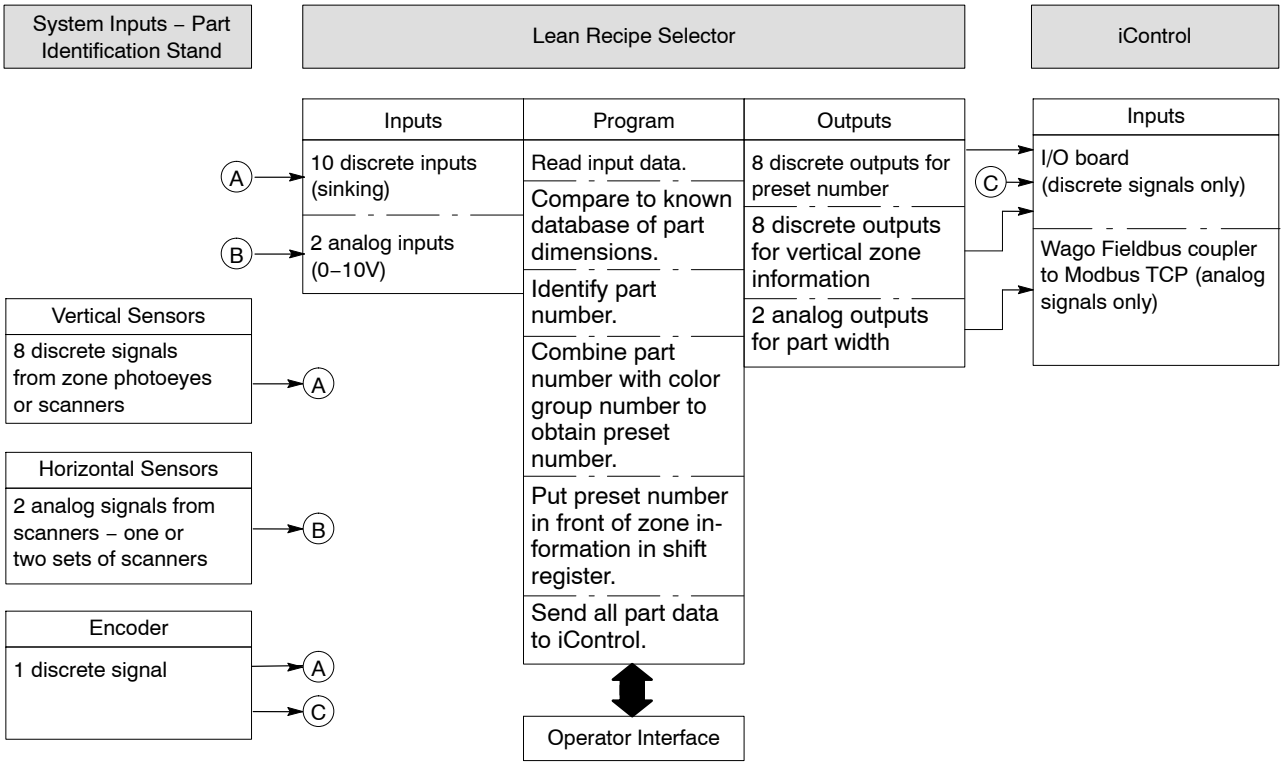


Figure 1 System Functional Diagram

Preset Selection

The LRS uses the iControl zone sensors (vertical discrete scanner or photoeyes) and conveyor encoder to detect the part length and height while the analog scanners used with gun positioners measure part width.

NOTE: Because the height of the part is determined by the zones the part is detected in, it is important that identical parts are hung with identical hangers.

The LRS compares the detected part dimensions to a customer-configured database of dimensions for the 20 part numbers. If the detected dimensions match the dimensions of one of the 20 part numbers, then the LRS applies the part number to the Color Group lookup table to produce a unique preset number between 1 and 100. The LRS sends the preset number to the iControl system first, then the zone and width information.

The Color Groups are selected manually by the operator. The following is an abbreviated version of the Color Group table. A full version is provided on page 10.

If Color Group 2 is selected and part number 18 is detected, then preset 38 is sent the iControl system. If Group 4 is selected and part number 12 is detected, then preset 72 is sent.

Part Number	Preset Number					
	Group 1	Group 2	Group 3	Group 4	Group 5	Recoat
1–20	1–20	21–40	41–60	61–80	81–100	101–120

NOTE: When the LRS is integrated into the iControl system, the iControl pickoffs (distance from zone sensors to guns) become virtual instead of absolute. Refer to LRS Pickoffs on page 10 for instructions on setting the iControl spray gun pickoffs.

Recoat Presets

In addition to the 100 presets that can be associated with parts, the LRS also provides 20 presets (101–120) for recoat. These are used when the operator manually selects Recoat. The system then identifies the parts by part number and sends the corresponding preset to the iControl system (for Part 1 preset 101 is sent, and so on).

Default Preset

The operator can also select a default preset number. If the LRS cannot identify a part, it will send this preset number to the iControl system. The default preset could contain no parameters, so that the part would not be coated, or a generic set of parameters that would work for all parts being coated at that time.

When the LRS cannot identify a part, it generates an alarm. The message “Unknown part past photoeyes” is displayed at the bottom of the LRS screen and the alarm is logged. Refer to *Alarms* on page 14.

System Configuration and Setup

Main Screen

The main screen appears after the system boots up.

Figure 2 Main Screen

Main Screen Functions

Alarm ACK: Acknowledges the alarm and removes the alarm message from the message bar at the bottom of the screen. Refer to Alarms on page 14.

Part Names: Opens the part naming screen. Use this screen to assign names to the 20 part types. The names appear on the Part ID screen when detected. You must be logged in to the system to make changes on this screen.

Part Setup: Opens the Part ID Setup screen (Figure 5). Use this screen to configure the Part ID system. You must be logged in to the system to make changes on this screen.

Part ID: Opens the operator screen. Use this screen for normal day-to-day operation.

Security: Opens the Log In/Log Out screen. Use this screen to log in and out of the system. You must log in to the system to make changes to the setup or configuration parameters.

Alarm Log: Opens the Alarm Log screen. Use this screen to view system alarm messages, acknowledge all active alarms, and silence alarm devices. Refer to Alarms on page 14.

System Configuration: Touch the Nordson logo to open the system configuration screen. Use this screen to set the date, time, and engineering parameters. You must be logged in to the system to make changes on this screen.

Security

You must log into the system to configure the system.

Touch the **Security** button on the Main screen. The Log In screen appears. Touch the LOGIN button and enter the following:

User: 106
Password: 106

The User name appears in the Current User field.

Touch CLOSE to close this screen.

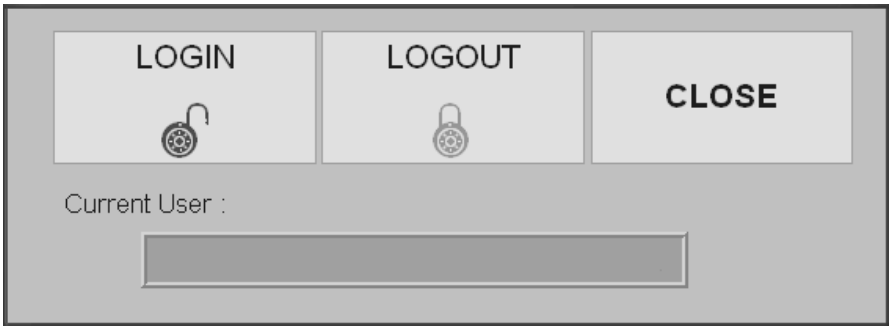


Figure 3 Security Screen

System Configuration

Log into the system (refer to Security), then touch the Nordson logo to open the Special Functions screen.

See Figure 4. To configure the LRS, enter values for the following functions:

- Time and Date (1)
- Width Scanner Size (2)
- Width Reading Count (3)
- Part Too Long Setpoint (4)
- Conveyor Speed Scaling Factor (6)
- 3 Sample Width Average (5) (if desired)
- Handoff Location (12)

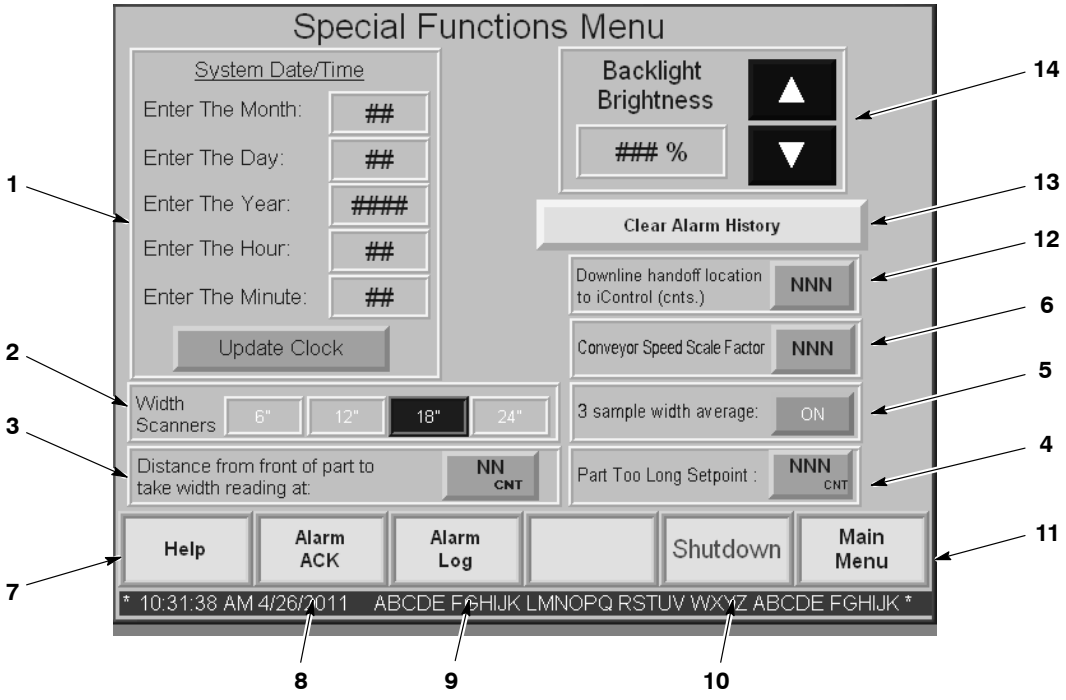


Figure 4 Special Functions Screen

Screen Functions

1. **Time and Date:** Touch the fields to enter the time and date. Touch the **Update Clock** button when done to update the PLC clock.
2. **Width Scanner Size:** Enter the length of the width scanners.
3. **Width Reading Count:** Enter the number of counts from the leading edge of the part at which to read the width of the part. Refer to item 7 to use width averaging over 3 counts.
4. **Part Too Long Setpoint:** Enter the number of counts (10–999) for the Part Too Long Alarm. If a zone sensor detects a part for more counts than the setpoint, a Part Too Long alarm will be generated. Typically this will indicate a problem with a zone sensor.

5. **3 Sample Wdith Average:** Enabling this function will cause the LRS to take three width samples, starting at the Width Reading Count, and averaging them to arrive at a part width. Enable this function to compensate for part sway on the conveyor.
6. **Conveyor Speed Scale Factor:** Enter the scaling factor required for the LRS system to convert the encoder signal to feet per minute (FPM).
7. **Help:** Touch to open Help screen.
8. **Alarm Ack:** Touch to acknowledge an alarm. Refer to *Alarms* on page 14 for more information.
9. **Alarm Log:** Touch to open the Alarm Log screen. Refer to *Alarms* on page 14 for more information.
10. **Shutdown:** Use this button to shut down the LRS operator interface before turning off system power. You must be logged in as a Nordson service representative to shut down the operator interface. This function is used only when loading a new program or update into the PLC.
11. **Main Menu:** Takes you back to the Main screen (Figure 2).
12. **Handoff Location:** Distance in encoder counts from the photoeyes to the position where the part data can be sent to the iControl system. The valid range is 36 to 240 counts. See Figure 7.
13. **Clear Alarm History:** Clears all alarms from the Alarm Log and the history file. Refer to *Alarms* on page 14 for more information.
14. **Backlight Brightness:** Use to change the brightness of the touch screen.

Part Setup

Part Number Setup

See Figure 5. Touch the Part Setup button on the Main screen to open the Part Setup screen. Use this screen and the More Information Screen to enter the dimensions for each Part Number.

If the parts tend to sway on their hangers with conveyor movement, you can use the maximum and minimum length and width parameters to compensate. For example, if part length in zone 1 is 36 counts, you may want to make the maximum count 37 and the minimum count 35.

1. See Figure 5. Select a Part Number (6).
2. Hang a part on the conveyor and run it through the part ID stand. The number of encoder counts that a part was detected for each zone appear in the Last Part Length fields (3) and the width in inches appears in the Last Part Width field(4).
3. Enter the desired Maximum and Minimum encoder counts for each zone in the length fields (8, 9). Touch a field to enter the count.
4. Enter the Maximum and Minimum width in the width fields (10).

If you want to adjust part number dimensions during production, use the More Information screen shown in Figure 5. This screen allows you to view the detected lengths and width of the last 4 parts in the queue, select the desired part to change, and adjust the maximum and minimum dimensions.

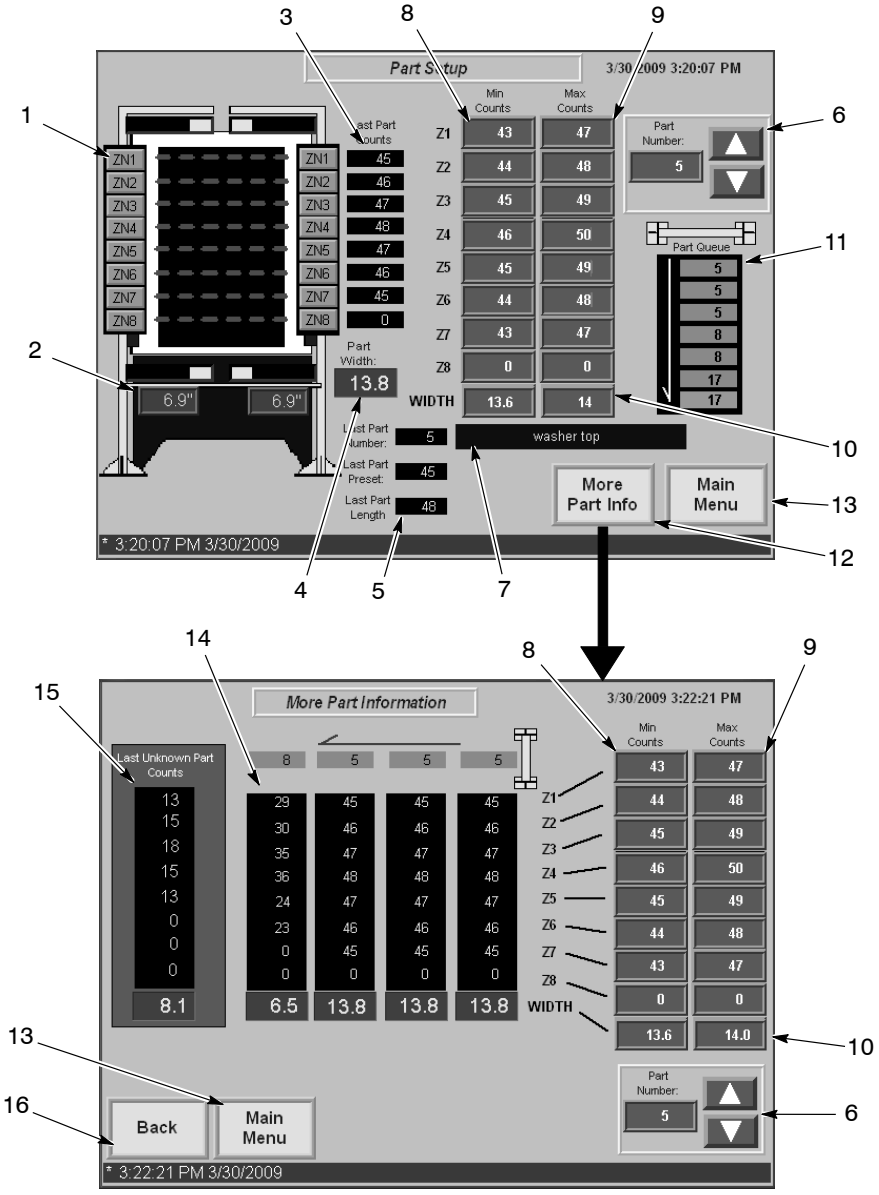


Figure 5 Part ID Screen

Screen Functions

1. **Zone Sensor Indicators:** Light green as long as a part is in front of a zone sensor.
2. **Detected Width Left/Right:** Width of current part, left and right of conveyor.
3. **Last Part Length Counts:** Number of counts that last part in part queue was in front of each zone sensor.

4. **Last Part Width:** Width of last part in part queue.
5. **Last Part/Preset/Length/Name:** Part Number, Preset, Length, and Name of last part detected.
6. **Part Number Selection:** Select Part to set up.
7. **Part Name:** Last part name. Name is assigned through Part Name screen.
8. **Minimum Length Counts:** Minimum number of counts, by zone, for selected part number.
9. **Maximum Length Counts:** Maximum number of counts, by zone, for selected part number.
10. **Minimum and Maximum Width:** Minimum and maximum width of selected part number.
11. **Part Queue:** Part numbers of parts in queue. Last part is at top.
12. **More Information Screen:** Touch to open the More Part Information screen. Use this screen to adjust part number dimensions during production.
13. **Main Menu:** Takes you back to the Main screen (Figure 2).
14. **Length and Width of Parts in Queue:** Length counts by zone, and widths, of the last 4 parts in the queue. The queue direction is indicated by arrow, so the last part through the part ID stand is the rightmost part.
15. **Length and Width of Last Unknown Part:** Length counts by zone, and width, of the last part that the LRS was unable to identify. Unidentified parts are coated with the default preset.
16. **Back:** Takes you back to the Part ID Setup screen.

Part Names

The Part Names screen allows you to assign names to each of the 20 part numbers. Touch a name field and use the onscreen keypad to type in a name for the part number. Touch the Main Menu button to go back to the Main screen.

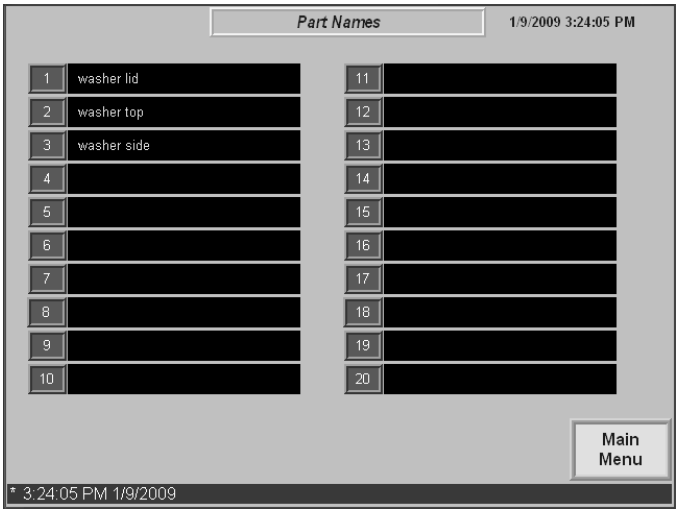


Figure 6 Part Names Screen

iControl Preset Setup

After you have setup your 20 parts, set up presets for each Color Group at the iControl console, plus the recoat presets, and a default preset. The default preset can be any number from 1–255, but should be a number above 120. Refer to the iControl Operator Interface manual 1056418 for help in setting presets.

Use the following lookup table when setting presets for the parts you have set up.

Part Number	Preset Number					
	Group 1	Group 2	Group 3	Group 4	Group 5	Recoat
1	1	21	41	61	81	101
2	2	22	42	62	82	102
3	3	23	43	63	83	103
4	4	24	44	64	84	104
5	5	25	45	65	85	105
6	6	26	46	66	86	106
7	7	27	47	67	87	107
8	8	28	48	68	88	108
9	9	29	49	69	89	109
10	10	30	50	70	90	110
11	11	31	51	71	91	111
12	12	32	52	72	92	112
13	13	33	53	73	93	113
14	14	34	54	74	94	114
15	15	35	55	75	95	115
16	16	36	56	76	96	116
17	17	37	57	77	97	117
18	18	38	58	78	98	118
19	19	39	59	79	99	119
20	20	40	60	80	100	120

Pickoffs

See Figure 7. Normally, when an iControl system is configured, the pickoff point is located at the zone sensors and the pickoff for each spray gun is the distance from the zone sensors to the spray gun. The iControl system starts tracking a part when the zone sensors see the part.

When a LRS system is installed, the pickoff point becomes virtual. The preset, zone, and width information is sent to the iControl system after the part exits the part ID stand, so the pickoff point is located somewhere between the part ID stand and the spray guns, depending on encoder resolution.

The virtual pickoff point can be determined by running a part through the part ID stand while watching the zone indicators on the iControl Input Status screen. Lay a strip of tape on the floor to mark the position of the leading edge of the part when the zone indicators on the Status screen illuminate. Measure from the tape to the spray guns and enter new pickoffs for each gun on the iControl Pickoff configuration Screen.

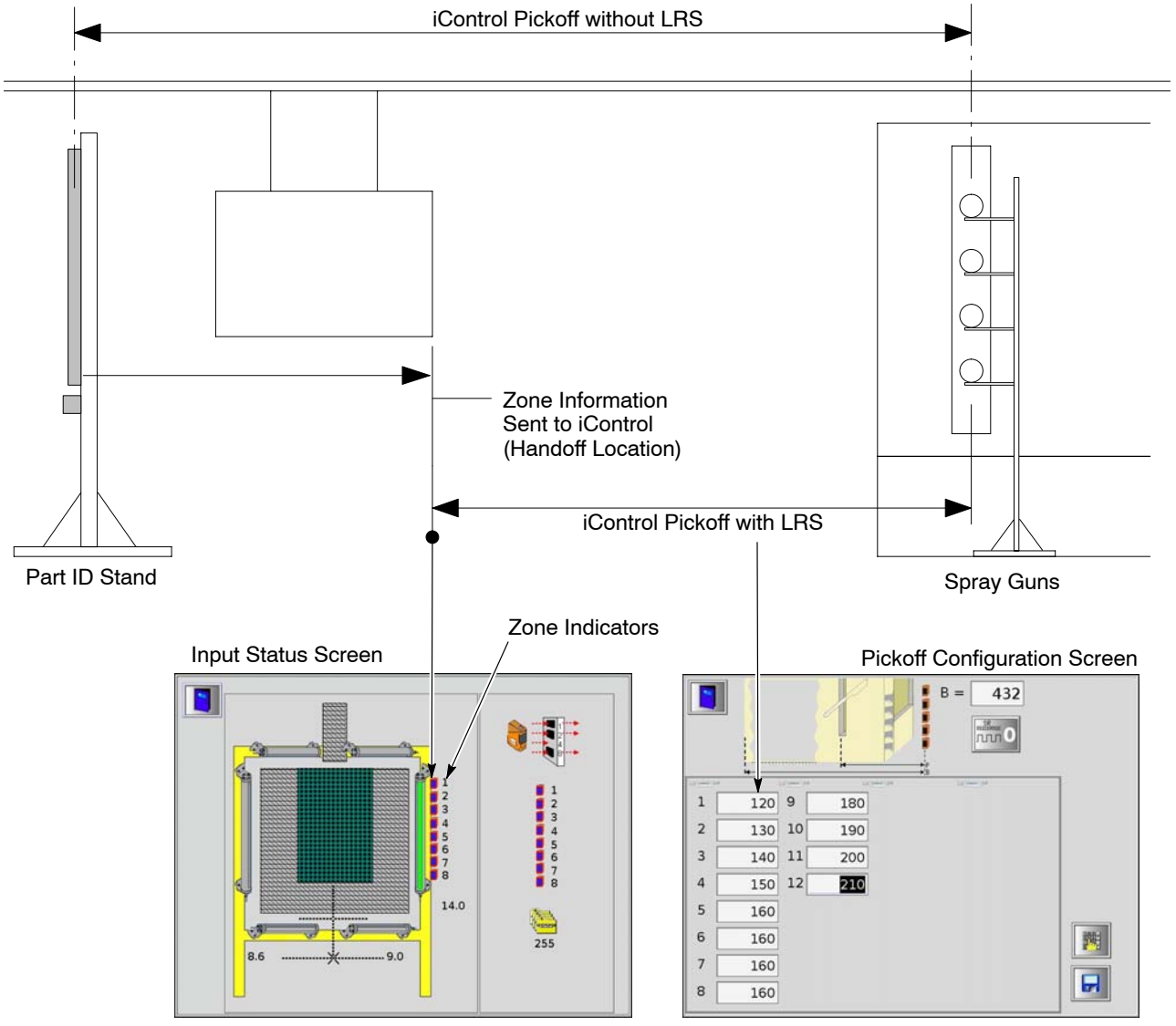


Figure 7 Part ID Screen

Operation

Touch the Part ID button on the Main screen to open the Part ID screen. This is the operator screen.

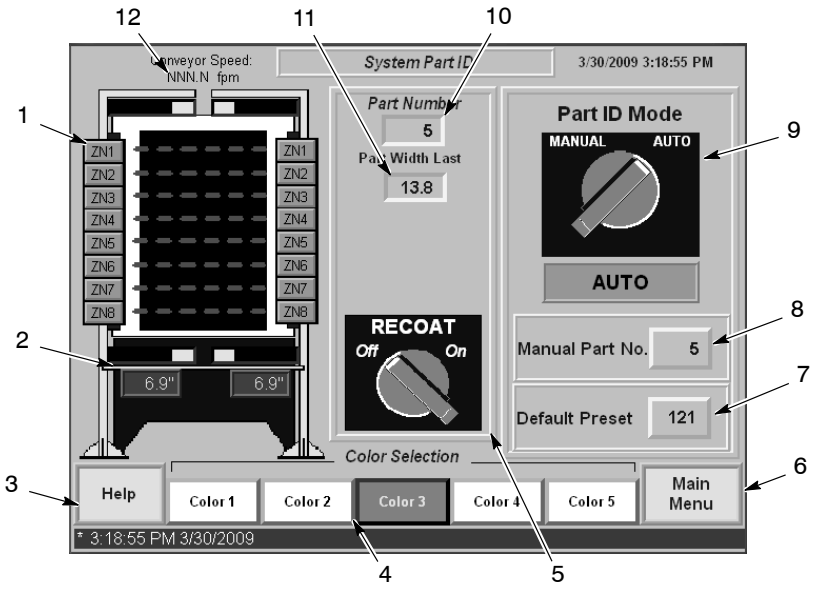


Figure 8 Part ID Screen

Default Preset: Enter a default preset (7) to use for unidentified parts. The preset can be set up with zero values so that the part is not coated, or with some values that will work for any part currently in production.

Automatic Operation: To operate the system automatically, switch the system to Auto mode (9), then select a Color Group (4).

Manual Operation: To operate the system manually, switch the system to Manual mode (9), select a Manual Part Number (8), then select a Color Group (4).

Recoat: To recoat parts, switch Recoat on (5). The system will send preset numbers 101–120 for parts 1–20.

Screen Functions

1. **Vertical Sensor Indicators:** Turn green when sensor is broken by a part.
2. **Detected Width Left/Right:** Width of current part, left and right of conveyor.
3. **Help:** Touch to open the Help screen.
4. **Select Current Color Group:** Touch a Color Group button to select it. The selected group determines the preset sent to the iControl system.
5. **Recoat Toggle Switch:** Touch to toggle Recoat presets on or off. When on, presets 101–120 are used with part numbers 1–20.

6. **Main Menu:** Touch to go to the Main screen.
7. **Default Preset Number:** Touch to enter a default preset number. This preset is sent to the iControl system when the LRS cannot identify a part. The default preset can be set to generic parameters, or so that the part is not sprayed.
8. **Manual Part Number:** Touch to enter a part number manually. The system will use this part number and the Color Group selected to determine the preset to send to the iControl. The Mode switch must be toggled to Manual.
9. **Mode Toggle Switch:** Toggles the operating mode between Auto and Manual. In Auto mode, the LRS sends preset numbers to the iControl system automatically; in Manual mode the operator enters the desired preset number.
10. **Part Number Detected:** Last part number detected.
11. **Last Part Width Detected:** Width of last part.
12. **Conveyor Speed:** Speed of conveyor, in feet per minute.

Alarms

The system will generate an alarm if it cannot identify a part, or if a part is too long. The part too long alarm is user configurable through the Special Functions screen (page 6).

If an alarm occurs, the alarm message appears on the message bar at the bottom of the screens, and on the Alarm screen (see Figure 9). If an external, customer supplied alarm device is connected to the LRS, it will be turned on.

The alarm is also logged into the Alarm history. The history file can be cleared through the Special Functions screen.

To acknowledge an alarm, touch the Alarm Ack button on the Main screen. This will erase the alarm message from the message bar.

- If the part is unidentified, determine why it could not be identified.
- To the part is too long, check the zone sensors to make sure they are operating properly.

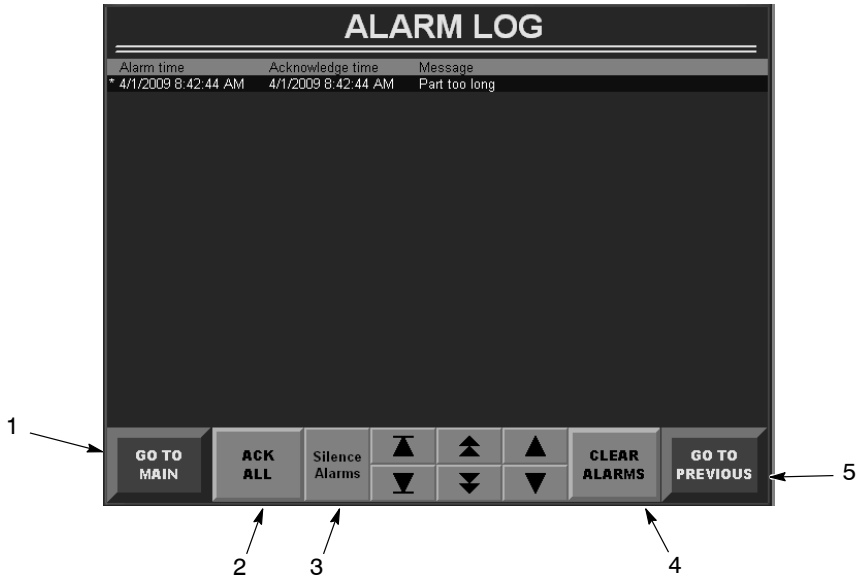
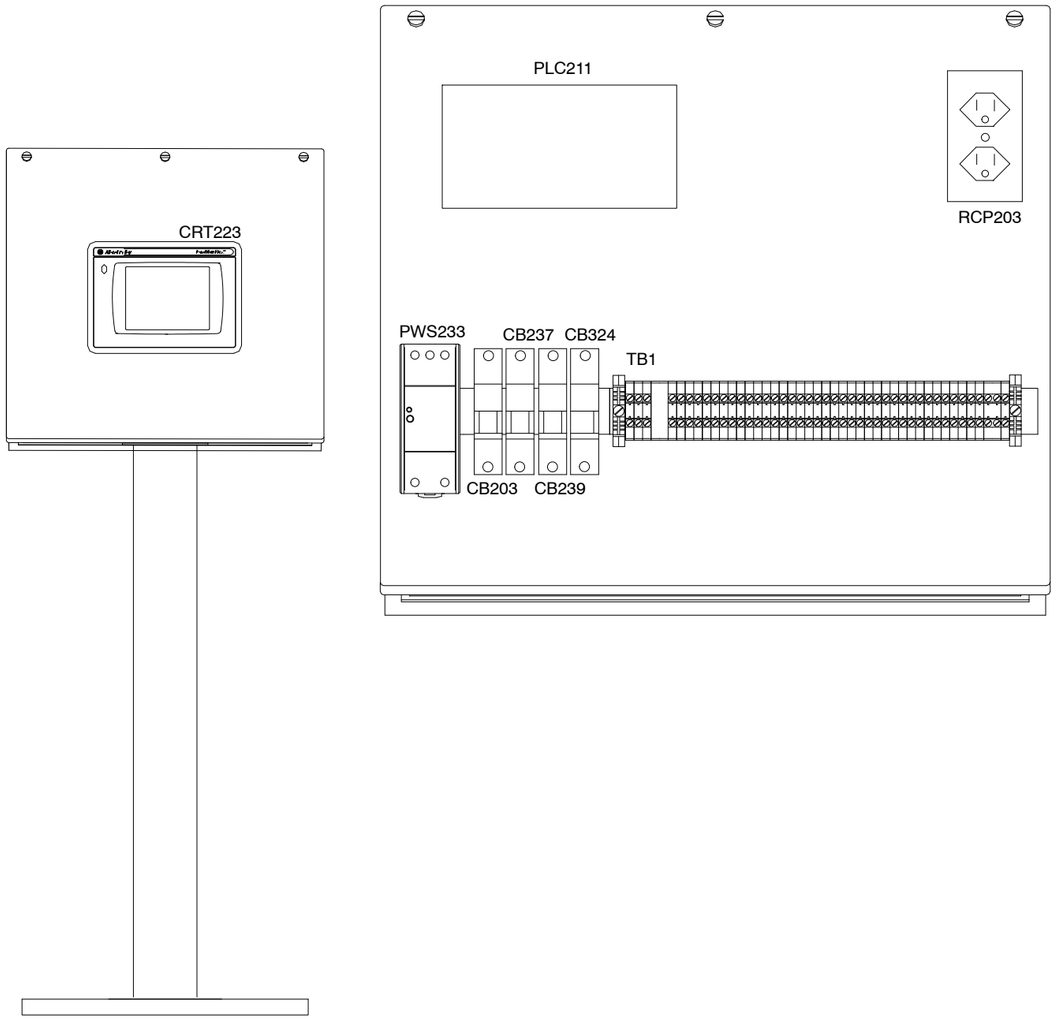


Figure 9 Part ID Screen

Screen Functions

1. **Go to Main:** Takes you to the Main screen.
2. **Ack All:** Acknowledge all active alarms.
3. **Silence Alarms:** Turns off external alarm device, if connected.
4. **Clear Alarms:** Clears all alarms from list. Alarms are still retained in history file until cleared through the Special Functions screen.
5. **Go to Previous:** Takes you back to the previous screen.



TB1	1FT	DIN RAIL	D5PD2–20	CUTLER–HAMMER
TB1	2	END ANCHOR	V7EA35	S&S
TB1	3	JUMPER	C383JC402	CUTLER–HAMMER
TB1	1	END BARRIER	1492EB3	ALLEN–BRADLEY
TB1	49	TERMINAL BLOCK	1492W4	ALLEN–BRADLEY
PWS238	1	POWER SUPPLY 24VDC, 90W	PS5R–SE24	IDEC
PLC211	1	MICROLOGIX 1100 PROCESSOR	1763–L16BWA	ALLEN–BRADLEY
PLC211	1	MICROLOGIX EEPROM MODULE	1763–MM1	ALLEN–BRADLEY
PLC211	1	MICROLOGIX ANALOG MODULE	1762–IF2OF2	ALLEN–BRADLEY
PLC211	1	MICROLOGIX RELAY OUTPUT	1762–OW16	ALLEN–BRADLEY
CRT223	1	OP. INTERFACE COLOR TOUCH 7	AB–2711P–T7C4D1	ALLEN–BRADLEY
RCP203	1	COVER PLATE	58C7	STEEL CITY
RCP203	1	UTILITY BOX	58361–1/2	STEEL CITY
RCP203	1	DUPLEX RECEPTACLE	5320 ICP	P&S
CB203,237,CB239;CB324	A/R	DIN RAIL	DEEPDIN	ABB
CB237	1	CIRCUIT BREAKER,4 AMP	1489A1C040	ALLEN–BRADLEY
CB203,239	2	CIRCUIT BREAKER,5 AMP	1489A1C050	ALLEN–BRADLEY
CB324	1	CIRCUIT BREAKER,2 AMP	1489A1C020	ALLEN–BRADLEY
	1	PEDESTAL BASE	A18SBASE	HOFFMAN
	1	STRAIGHT PEDESTAL	A44CCOL	HOFFMAN
	1	CONSOLET	C20C20	HOFFMAN
OPERATOR INTERFACE ENCLOSURE				
ITEM	QTY.	DESCRIPTION	PART NO.	MFG.

Figure 10 Lean Recipe Selector – Drawing 1 of 4

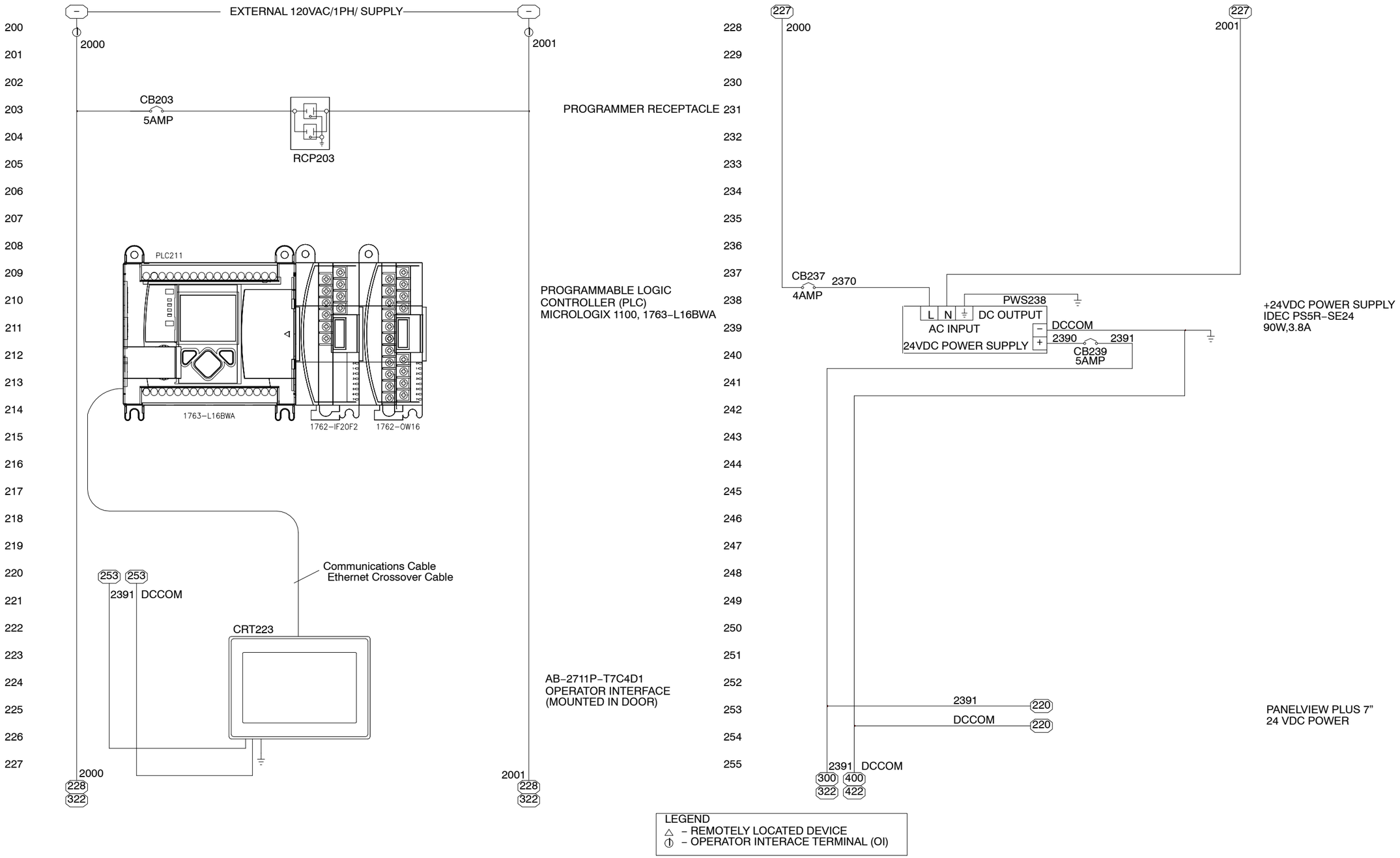


Figure 11 Lean Recipe Selector – Drawing 2 of 4

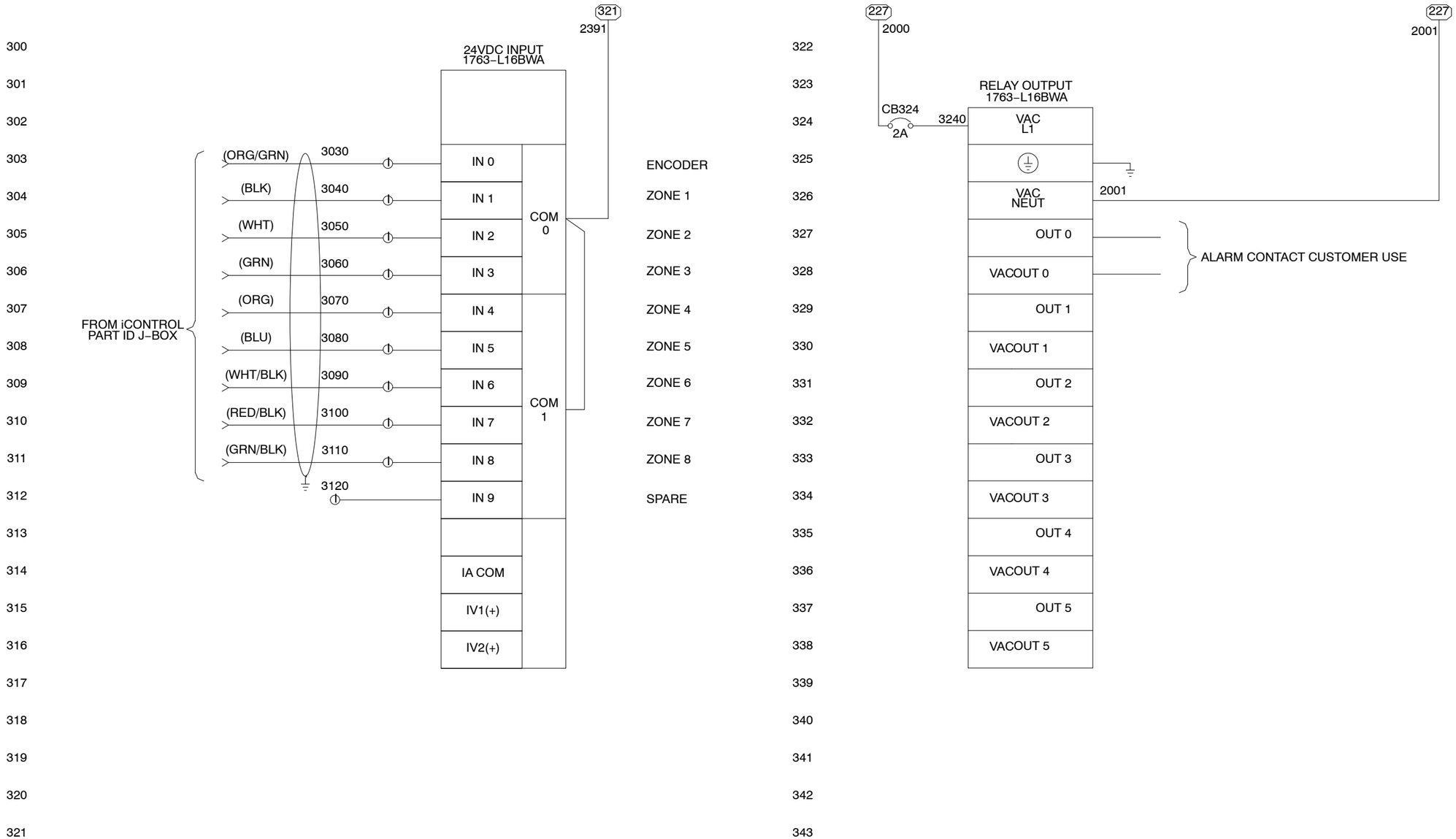


Figure 12 Lean Recipe Selector – Drawing 3 of 4

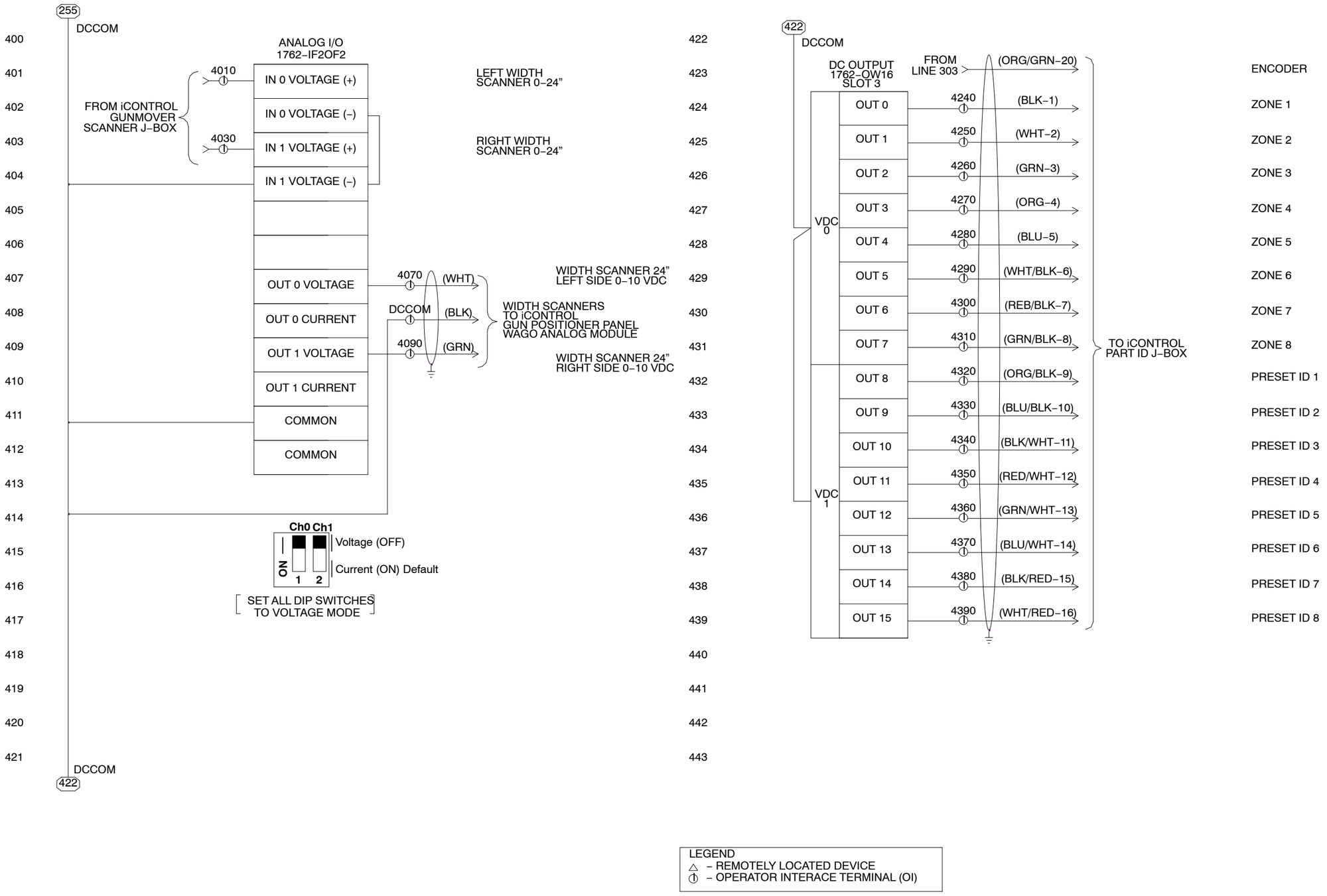


Figure 13 Lean Recipe Selector – Drawing 4 of 4