

ELECTRONIC DEVICE CONTROLLER
SUBMERSIBLE PUMP CONTROL WIRE ISOLATION SYSTEM

**INSTALLATION, OPERATION
and MAINTENANCE
INSTRUCTIONS**

100 SERIES

MODELS 101-xxxxxx & 102-xxxxxx



R.S. Electronic Controls, Inc.

3800 Jacobs Road • Waterford, WI 53185
Phone 262-514-4610 • Fax 262-514-4611

LIMITED WARRANTY

R.S. Electronic Controls, Inc. warrants that the product is free from manufacturing and material defects for a period of one year from the date of installation or fifteen (15) months from the date of manufacturer' invoice, whichever first occurs. Provided that the customer notifies R.S. Electronic Controls, Inc. within the above applicable period, R.S. Electronic Controls, Inc. will, at its option, either repair or replace the defective product, free of charge, excluding shipping charges. This limited warranty is contingent upon proper use and installation of the product and does not cover a product which has been modified, damaged because of unusual physical or electrical stress, or damaged because of improper installation.

R.S. ELECTRONIC CONTROLS, INC. MAKES NO OTHER EXPRESSED OR IMPLIED WARRANTY WITH RESPECT TO THE PRODUCT OTHER THAN THE LIMITED WARRANTY SET FORTH HEREIN. R.S. ELECTRONIC CONTROLS, INC. DISCLAIMS ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE LIABILITY OF R.S. ELECTRONIC CONTROLS, INC., IF ANY, FOR DAMAGES RELATING TO ANY ALLEGED DEFECTIVE PRODUCT SHALL UNDER ANY LEGAL THEORY BE LIMITED TO THE ACTUAL PRICE PAID FOR SUCH PRODUCT AND SHALL IN NO EVENT INCLUDE INCIDENTAL, CONSEQUENTIAL, SPECIAL, OR INDIRECT DAMAGES OF ANY KIND, EVEN IF R.S. ELECTRONIC CONTROLS, INC. IS AWARE OF THE POSSIBILITY OF SUCH DAMAGES.

RETURNED PARTS

Warranty or exchange returns should be shipped prepaid with a note on the problem description.

Warranty information must include date of installation, Invoice number and date, Model no., Serial no., problem description.

SHIPPING

R. S. ELECTRONIC CONTROLS, INC.
3800 Jacobs Rd.
Waterford, WI 53185

TELEPHONE (262) 514-4610 **FAX** (262) 514-4611

WEB SITE www.rselec.com

CAUTION

This is a **PILOT DUTY** device; it is not to be used for direct control of any type of motor. This device has been designed to control horsepower rated relays to run motors, and not run motors directly. These relays can have a *maximum* of 120 VAC coils.

When in doubt, check the current and voltage across the two wires this device will be switching. Some motor control boxes switch one side of the motor power at 240 VAC.

WARNING:
**WHEN SERVICING, RISK OF ELECTRIC SHOCK - MORE THAN ONE
DISCONNECT MAY BE REQUIRED TO DE-ENERGIZE THIS EQUIPMENT
BEFORE SERVICING.**

INSTALLATION

Installation of this product must comply with Local, State and National Codes.

This product is not suitable for installation in any wet, hazardous or explosive location.

Do not use knockouts on the top or sides of the enclosure. Use only the knockouts on the bottom.

To get the full benefit of installing this controller it is advisable to have each dispenser on its own circuit breaker. In the case of mechanical dispensers it is advisable to have each hose on its own circuit breaker.

EMERGENCY SHUT OFF SWITCHES

When emergency shut off switches are required, the shut off switch should also control the AC power and the LINE terminal(s) on the Relay and Power Supply module. Then, if there is an emergency, the by-pass switches cannot over-ride the emergency shut off.

ELECTRONIC LINE LEAK DETECTORS

This controller is compatible with most Electronic Line Leak Detection systems. However, it must be installed so that the output from the controller is connected to the input of the Line Leak Detector. See the Line Leak Detector drawings.

240 VOLT CONTACTORS

When controlling contactors with 240 volt coils it is necessary to install an additional relay with a 120 volt coil to control the contactor, then use the relay contacts to control the contactor.

WIRING DIAGRAMS

Wiring diagrams are furnished only as a guide to the installation of this product. When connecting to other manufacturers equipment or devices, that manufacturer's installation and operation instructions should also be consulted.

This controller was originally designed for service station use, but there can be many other uses, using different equipment and wiring variations.

It would be impossible to include wiring diagrams for all installation variations of this product; included are several typical service station wiring diagrams.

STAGE II, Vapor recovery

Located above U3 on the RPS module is a 8-pin socket that diodes can be inserted into to make submersible pumps or vacuum pumps operate at the desired time for vapor recovery systems. This socket is numbered 1 - 8 from left to right and controls outputs 1 - 8.

BASIC OPERATION

When dispensers are used to control submersible pumps and no method of isolation is used in the submersible control wiring, hazardous feedback can occur in other dispensers that may not be in use. Relays are usually installed to correct this problem. This controller has been designed to eliminate relays and the large amount of interwiring that is necessary to wire these relays.

INPUT & SELECTOR MODULE

Each module can accept up to 8 submersible control wires. The upper terminal strip is connected to the dispenser submersible control wiring and its respective Neutral or common connection is directly below it on the lower terminal strip. Do not connect any INPUT & SELECTOR neutrals to the neutral on the RPS Module.

If Switched Neutral circuit breakers are used the dispenser neutral and the input Neutral should come from same breaker. Multi-product dispensers will require jumper wires between the Neutral terminals, See wiring diagrams.

Input signals from solid state devices with floating voltages in the off state may cause unpredictable results at the outputs on the RPS module. However, a resistor is included in the input circuit to pull this voltage down to an acceptable level.

ACCEPTABLE INPUT VOLTAGES, with 10k pull down resistor -

OFF: 0 - 50 VAC

ON: 80 - 120 VAC

QUESTIONABLE: 50 - 80 VAC

Input voltage that is not at "0" volts in the off state may cause the input LED (RED) to glow slightly.

RED LED's (8):

Each LED will indicate when voltage is present on its input terminal. These LED's will still operate if the controller is not powered.

YELLOW LED:

12 VDC from the power supply.

GREEN LED:

This is for testing purposes only and should not be on during normal operation. To test the input optical isolator, set the input to be tested to 9 on the selector switch and apply voltage to the input; the LED will light if the optical isolator and PC Module connections are good.

SELECTOR SWITCHES:

These switches are used to set each controlling input (Letters B - J) to an output (Numbers 1 - 8) on the RPS module. **When setting these switches, do not set any input switch to turn on more than one output.** There is one exception to this. More than one switch can be set on applications where it is necessary to turn on two

submersible pumps at one time using only one input. **CAUTION**, if any input is set to turn on only one of these submersible pumps, both pumps will always turn on.

RELAY & POWER SUPPLY MODULE

Part No. 100-RPS-4 can control a maximum of 4 devices. Part No. 100-RPS-8 can control a maximum of 8 devices.

Each output is controlled by a single pole relay. Above each relay is a RED LED to indicate the relay control status. **WARNING: DUE TO SPECIAL COMPONENTS IN THIS CIRCUIT IT CAN SWITCH 120 VAC CIRCUITS ONLY.** To use 240 Volt contactors see page 2, 240 VOLT CONTACTORS.

Each output is also controlled by a toggle switch. This switch is used to set the controller to "AUTO" (AUTOMATIC), "OFF" or "ON" operation. The "ON" position is a momentary/test position and can be used for testing other devices that may be connected to the outputs. **DO NOT USE THIS SWITCH TO MAKE LINE LEAK DETECTION DEVICES WORK PROPERLY.**

YELLOW LED:

12 VDC from the power supply.

RED LED's (2):

The top LED indicates AC line voltage at terminal L1 (power supply voltage).

The bottom LED indicates AC line voltage present on the Output Disable terminal, this LED will still operate if the controller is not powered.

GREEN LED's (2):

The top LED is for future use.

The bottom LED indicates RUN - STOP status from the Output Disable terminal or the Output Disable terminal by-pass jumper on J1.

Both LED's must be on for the controller to operate.

OUTPUT DISABLE:

This is an optional feature, outputs are enabled when this terminal is energized with 120 VAC from any other UL Recognized switch or device. When it is de-energized, it will then disable anything that is connected to the output terminals.

All EDC's are shipped with this feature enabled, if it is not used it must be disabled, move the jumper on J1 from pins 2 - 3 to 1 - 2 to disable this feature.

WARNING:
THE OUTPUT DISABLE TERMINAL WILL HAVE NO CONTROL
IF THE TOGGLE SWITCHES ARE SET TO "ON" OR THE
JUMPER ON J1 IS ON PINS 1 - 2.

SETUP INSTRUCTIONS

Complete Setup Chart and leave it on site with the controller for future reference.

- 1 - Define PRODUCT PUMPS using CHART 2.
- 2 - Assign each Input (Letters B - J) a number on CHART 1 using the Output Numbers from CHART 2.
- 3 - Using the Output Numbers from CHART 1, set the selector switches on each I & S module. (Left is "ON" - Right is "OFF")
- 4 - Set any unused selector switches to "OFF" (Right position).
- 5 - If the Output Disable Terminal is not used, move the jumper on J1 from pins 2 - 3 to pins 1 - 2.
- 6 - Set by-pass switches to AUTO, set any unused switches to OFF.

WARNING:
THE OUTPUT DISABLE TERMINAL WILL HAVE NO CONTROL IF THE TOGGLE SWITCHES ARE SET TO "ON" OR THE JUMPER ON J1 IS ON PINS 1 - 2.

CHART 1			
INPUT MODULE SWITCH SETTINGS			
INPUT NO.	MODULE NO.	MODULE INPUT	OUTPUT NO.
1	1	B	
2		C	
3		D	
4		E	
5		F	
6		G	
7		H	
8		J	
9	2	B	
10		C	
11		D	
12		E	
13		F	
14		G	
15		H	
16		J	
17	3 *	B	
18		C	
19		D	
20		E	
21		F	
22		G	
23		H	
24		J	
25	4 *	B	
26		C	
27		D	
28		E	
29		F	
30		G	
31		H	
32		J	

CHART 2	
OUTPUT MODULE PRODUCT PUMP ASSIGNMENT	
OUTPUT NO.	PRODUCT PUMP
1	
2	
3	
4	
5	
6	
7	
8	

* Input modules 3 and 4 are used only in Series 102-xxxxxx controllers with 17 or more inputs.

SETUP EXAMPLE, SERVICE STATION USE

This is an example of a Service Station set up, using Model 101-081600 Controller, with 5 Product Pumps and 18 Hoses.

ISLAND	HOSE	PRODUCT	TYPE OF DISPENSER
1	1	UNLEADED	DUAL Side A
	2	UNLEADED	Side B
	3	UNL/MID-GRD	DUAL Side A
	4	PRE/UNL	Side B
2	5	DIESEL 1	SINGLE
	6	UNLEADED	<i>MULTI-PROD</i> Product A
	7	UNL/MID-GRD	(2 Hoses Product B
	8	PRE/UNL	each Prod) Product C
3	9	UNLEADED	SINGLE/FUTURE DUAL
	10	-----	FUTURE
	11	UNL/MID-GRD	SINGLE
	12	PRE/UNL	SINGLE
4	13	DIESEL 1	SINGLE
	14	DIESEL 1	SINGLE
	15	DIESEL 2	SINGLE
	16	DIESEL 2	SINGLE

CHART 1 INPUT MODULE SWITCH SETTINGS			
INPUT NO.	MODULE NO.	MODULE INPUT	OUTPUT NO.
1	1	B	1
2		C	2
3		D	3
4		E	4
5		F	1
6		G	2
7		H	3
8		J	1
9	2	B	Off
10		C	2
11		D	3
12		E	4
13		F	4
14		G	5
15		H	5
16		J	Off
17	3 *	B	
18		C	
19		D	
20		E	
21		F	
22		G	
23		H	
24		J	
25	4 *	B	
26		C	
27		D	
28		E	
29		F	
30		G	
31		H	
32		J	

CHART 2 OUTPUT MODULE PRODUCT PUMP ASSIGNMENT	
OUTPUT NO.	PRODUCT PUMP
1	UNLEADED
2	UNL/MID-GRADE
3	PREMIUM UNL
4	DIESEL 1
5	DIESEL 2
6	
7	
8	

* Input modules 3 and 4 are used only in Series 102-xxxxxx controllers with 17 or more inputs.

SPECIFICATIONS

POWER REQUIREMENTS

Power Supply	120 VAC 50-60 Hz 20 Watts
Controlling Input, each	120 VAC .020 Amp
Output Disable, See note 1	120 VAC .010 Amp

FUSES

Power Supply	1/4 Amp slow-blow
Output, each	5 Amp fast-blow

TEMPERATURE, Enviromental +35 to +110 Degrees F.

OUTPUT SWITCHING, each

Contacts SPST Form A	125VA, 120 VAC maximum
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	SERIES 101-	SERIES 102-
PHYSICAL SIZE	12"H x 12"W x 4"D	12"H x 18"W x 4"D
WEIGHT	11 Lbs.	15 Lbs.
MAXIMUM INPUTS	16	32
MAXIMUM OUTPUTS	8	8

MODEL DESCRIPTIONS

SERIES 101-xxxxxx

MODEL	MODULE PART NO. AND POSITION		
	100-IS8	100-RPS-4	100-RPS-8
101-040800	1 *	3	--
101-041600	1 2	3	--
101-080800	1 *	--	3
101-081600	1 2	--	3

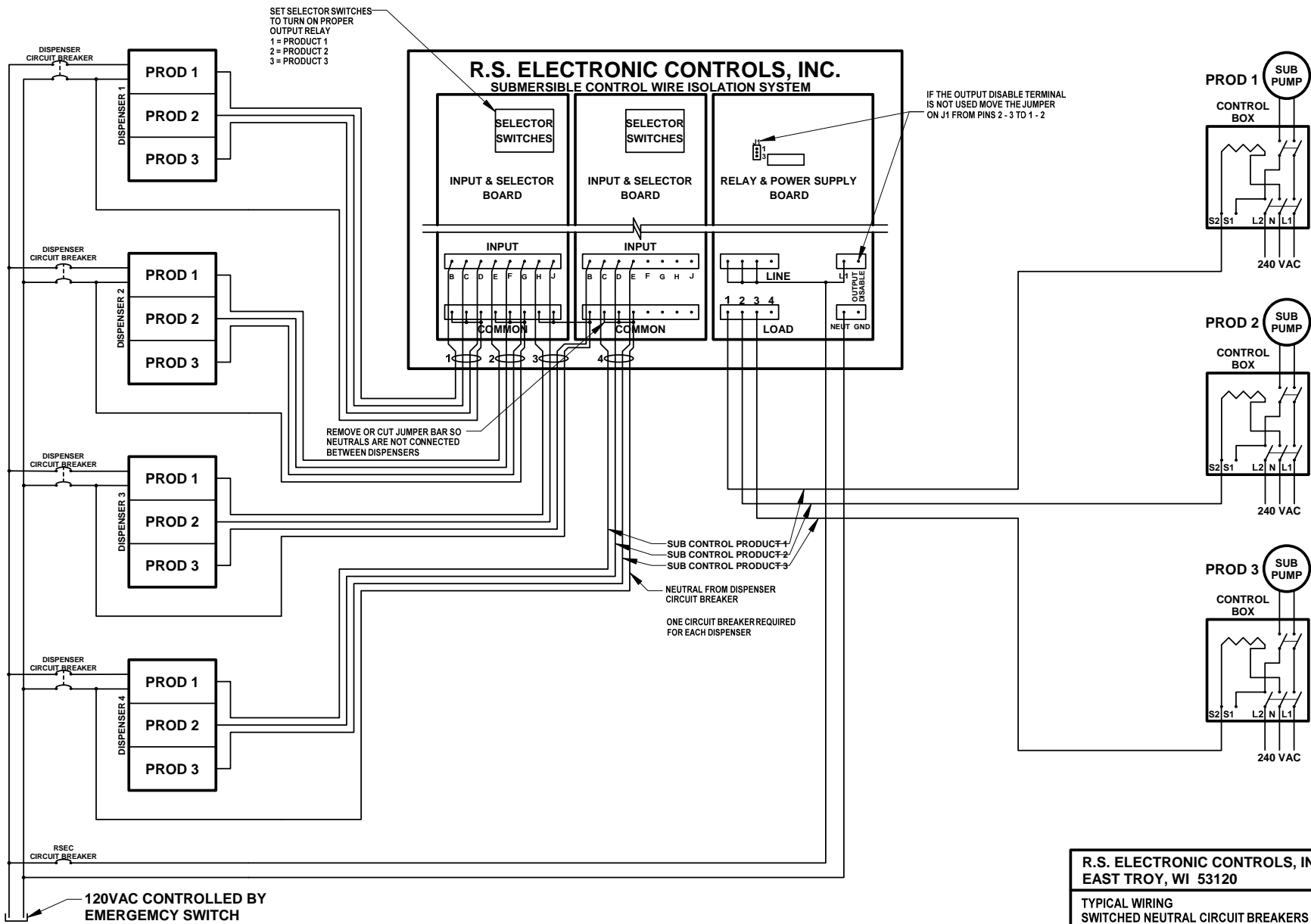
SERIES 102-xxxxxx

MODEL	MODULE PART NO. AND POSITION		
	100-IS8	100-RPS-4	100-RPS-8
102-040800	1 * * *	5	--
102-041600	1 2 * *	5	--
102-042400	1 2 3 *	5	--
102-043200	1 2 3 4	5	--
102-080800	1 * * *	--	5
102-081600	1 2 * *	--	5
102-082400	1 2 3 *	--	5
102-083200	1 2 3 4	--	5

" * " Blank space for future expansion

NOTES

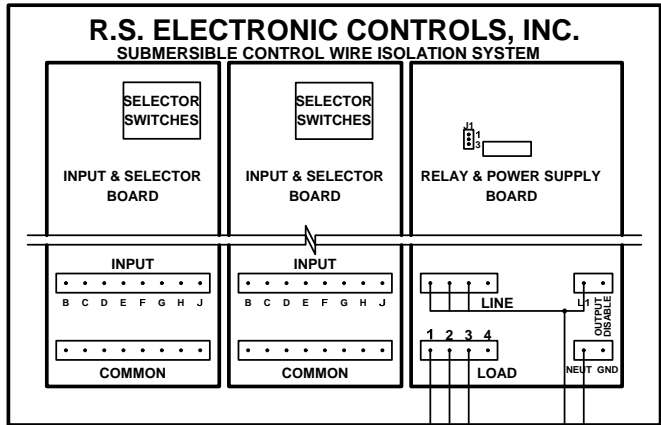
1 - OUTPUT DISABLE was formerly called EMERGENCY INPUT



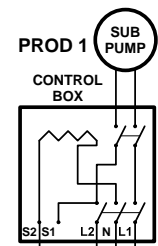
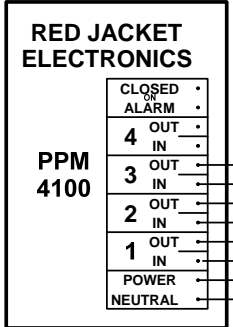
R.S. ELECTRONIC CONTROLS, INC.
 EAST TROY, WI 53120

TYPICAL WIRING
 SWITCHED NEUTRAL CIRCUIT BREAKERS
 MULTI-PRODUCT DISPENSERS
 3 PRODUCTS

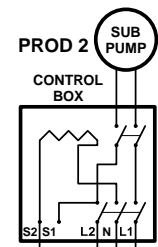
DRAWN BY: R. SCHNEIDER	DATE: 12/15/97	DRAWING: TYPWIRE.TCW
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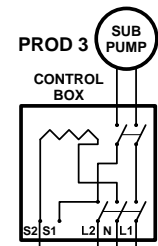
DISPENSER WIRING NOT SHOWN



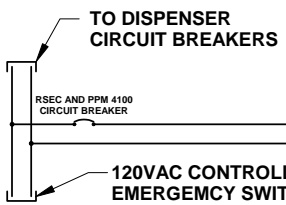
240 VAC



240 VAC



240 VAC



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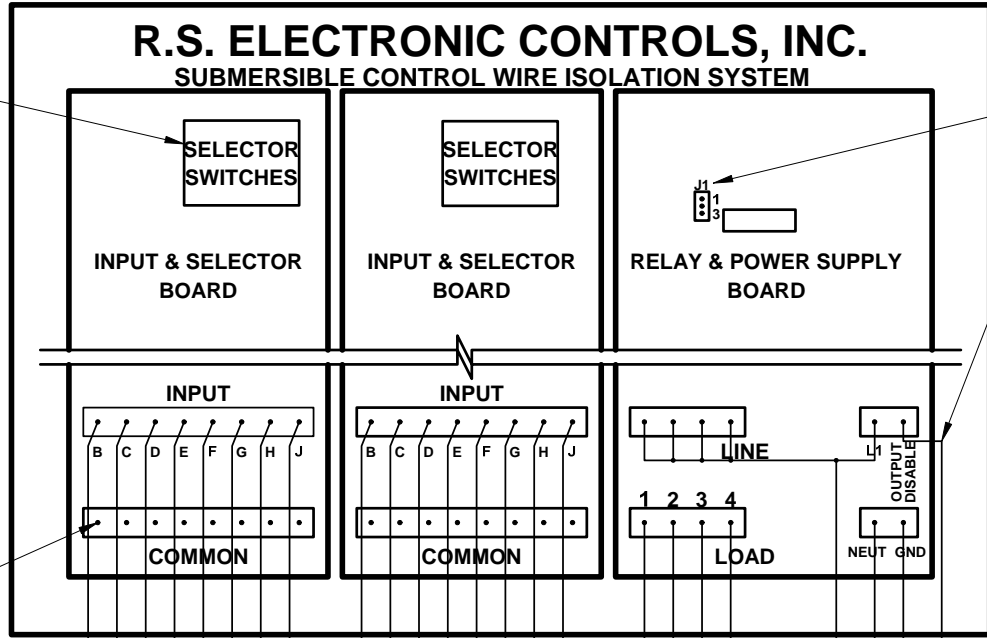
ELECTRONIC LINE LEAK DETECTION
 RED JACKET
 PPM 4000 SYSTEM

DRAWN BY: R. SCHNEIDER DATE: 12/24/97 DRAWING: RJ_PPM.TCW

R.S. ELECTRONIC CONTROLS, INC.

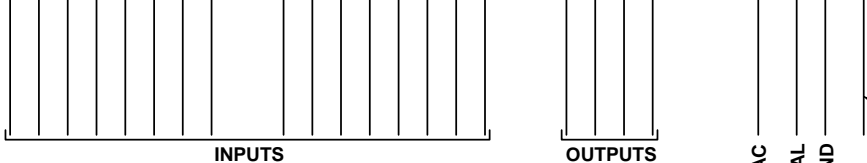
SUBMERSIBLE CONTROL WIRE ISOLATION SYSTEM

SET SWITCHES (B - J) TO CONTROL DESIRED OUTPUT (1 - 8)



OPTIONAL OUTPUT DISABLE CONNECTION, IF NOT USED JUMPER ON J1 MUST BE MOVED FROM PINS 2 & 3 TO 1 & 2

NEUTRAL CONNECTIONS NOT SHOWN - SEE MANUAL



120 VAC FROM DISPENSER SUBMERSIBLE CONTROL WIRES. THE NUMBER OF INPUTS USED IS DETERMINED BY THE QUANTITY AND TYPE OF DISPENSERS.

TO SUBMERSIBLE MOTOR RELAYS, OR ELECTRONIC LINE LEAK DETECTION IF USED.

120 VAC
NEUTRAL
GROUND

OUTPUT DISABLE
120 VAC - RUN
0 VAC - STOP

R.S. ELECTRONIC CONTROLS, INC.
EAST TROY, WI 53120

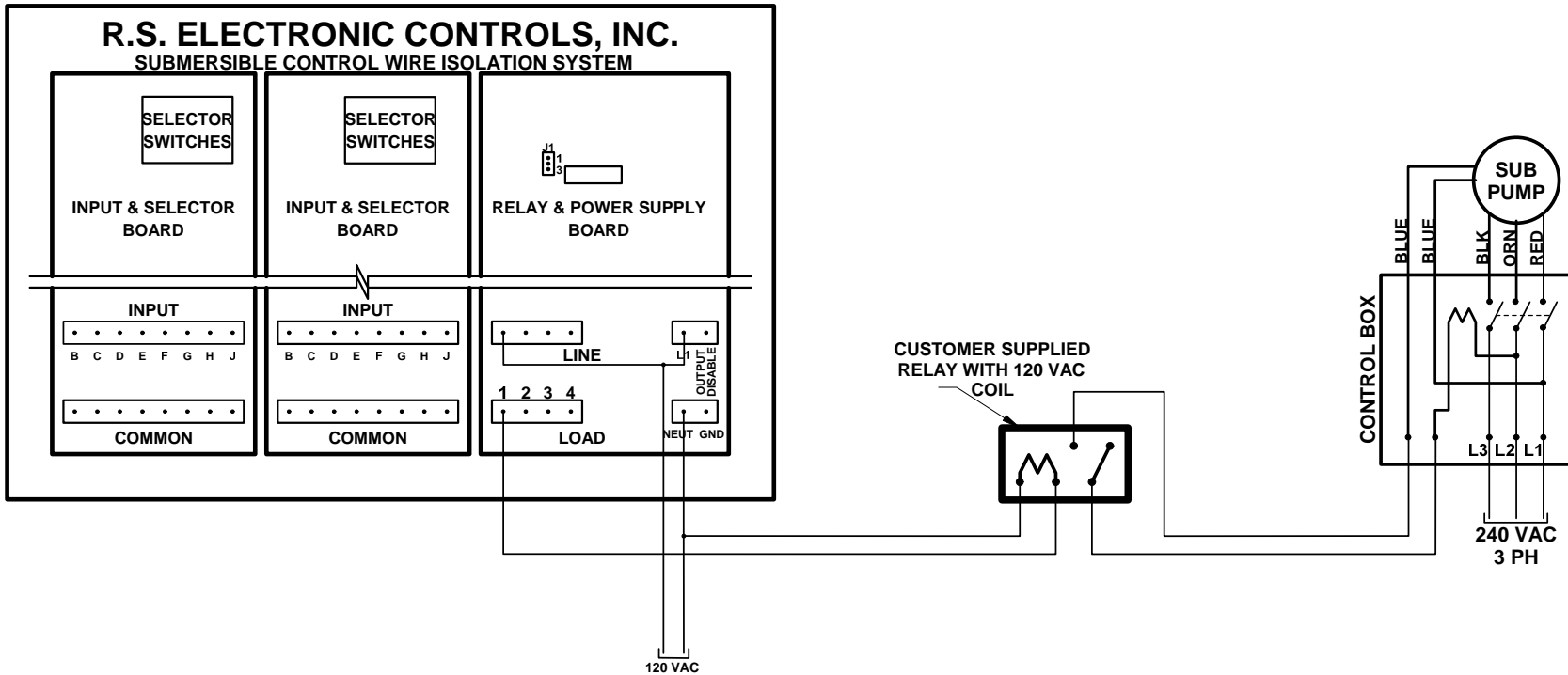
TYPICAL WIRING
INPUT, OUTPUT AND
POWER CONNECTIONS

DRAWN BY:
R. SCHNEIDER

DATE:
12/24/97

DRAWING:
IN_OUT.TCW

R.S. ELECTRONIC CONTROLS, INC.
SUBMERSIBLE CONTROL WIRE ISOLATION SYSTEM



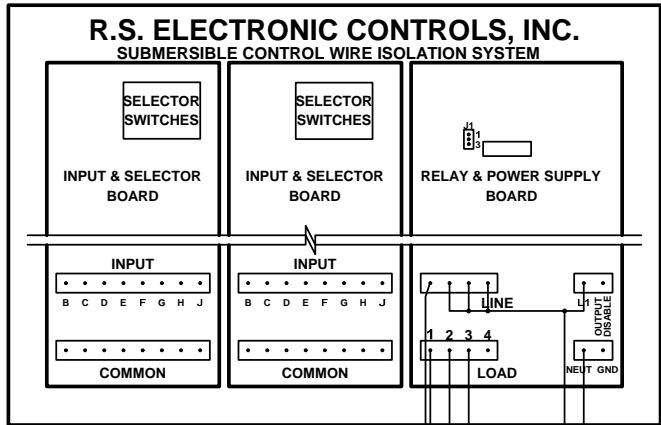
R.S. ELECTRONIC CONTROLS, INC.
 EAST TROY, WI 53120

TYPICAL WIRING
 240 VOLT CONTACTORS

DRAWN BY:
 R. SCHNEIDER

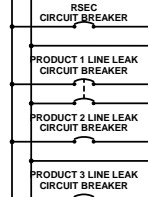
DATE:
 12/24/97

DRAWING:
 240_VOLT.TCW

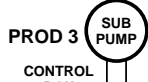
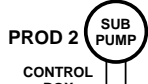
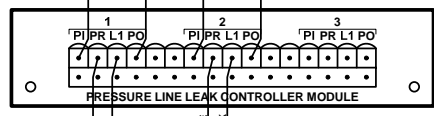
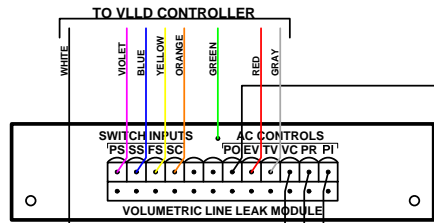


DISPENSER WIRING NOT SHOWN

TO DISPENSER
 CIRCUIT BREAKERS



120VAC CONTROLLED BY
 EMERGENCY SWITCH



R.S. ELECTRONIC CONTROLS, INC.
 EAST TROY, WI 53120

ELECTRONIC LINE LEAK DETECTION
 VEEDER-ROOT
 VOLUMETRIC AND PRESSURE SYSTEMS

DRAWN BY: R. SCHNEIDER	DATE: 12/24/97	DRAWING: VR_LLD.TCW
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Diodes can be added to our RPS Module to make the output relays operate as needed for Blenders and Stage II vapor recovery systems.

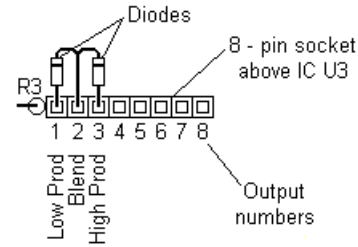
These are some of the more common examples and each may be varied as necessary.

Diodes can be 1N914/4148 or equivalent. RadioShack 276-1122, Pkg 10/\$1.19

Note the diode orientations when installing.

3 - Wire Blenders

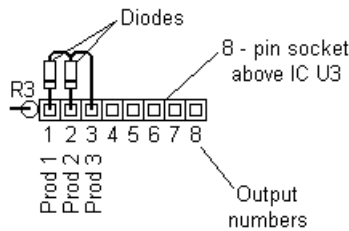
This can be used with dispensers that have been converted to blenders to eliminate the blend control relay.



Any input that is set to 2 will energize both Low & High products

If necessary the blender diodes can combined with either vapor recovery system below.

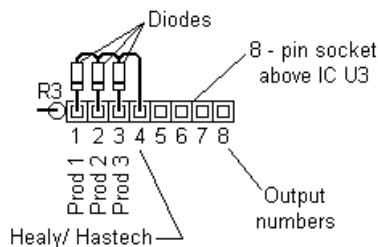
Healy Mini-Jet 9000



Healy vapor recovery system is on Prod 3
Product 1 or 2 will always energize Prod 3

These diodes can be used to eliminate some interwiring and solid state relays normally hidden in the wiring troughs when using these vapor recovery systems.

Healy Model 500 or Hastech



Healy Model 500 or Hastech system is on Prod 4
Products 1,2 or 3 will always energize Prod 4

Caution

If this equipment is connected to any kind of Electronic Line Leak Detection equipment the “LOAD” terminals on the RPS output module must be the same phase as the Electronic Line Leak Detection power. Failure to do so may cause blown fuses and/or damaged equipment in either the RPS module or the electronic equipment that it is connected to.

The easiest way to avoid problems is to have the RPS “LINE” power and the Electronic Line Leak Detection power on the same circuit breaker, and that circuit breaker, or circuit should also be controlled by the EMERGENCY SHUT OFF.