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NE152 Duplex Pump Controller

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Overview

- Duplex pump down control
- Duplex alternator

NE152 Product Specifications:

Power Supply Input: 120VAC @ 20VA

Power Supply Output: 13.8 VDC @ 250mA w/120VAC input.

Analog Input: 4-20mA (250 ohm load), 1-5VDC (0.5-6 VDC)

Calibration Adj: 10-100% of analog input range for full scale display;
0-90% of analog suppression/offset

Quelling: 0-90 second full range input excursion

Control Inputs: Active low w/Passive Pull-up(Return to input common)

Alarm Horn Outputs: Open collector 30VDC @ 250mA

Dimensions: 8 ½ " high x 7 ½ " wide x 3 ½ " deep

Environmental: Operating temperature 0 to 165 F

Humidity: 10-95% non-condensing

The **NE152** is simplicity at its best with "View-At-A-Glance" design that allows quick and easy indication of system configuration/status and adjustment of operational parameters.

The **NE152** pump and alarm controller is an excellent choice for control of duplex sewage or stormwater lift pump stations or other similar process application requiring pump down control. Because of its built-in capabilities and compact design, the controller is economical, space-saving, and easily integrated into new pump stations or retrofitted into existing pump station control systems.

The **NE152** provides full-range, differential control of two pumps plus High and Low (Abnormal) level alarm in response to a 1-5 volt DC or 4-20mADC level-proportional signal as provided by an external sensor. The controller works with a wide range of available level sensors such as a submersible level transducer, an air purge "bubbler" transducer level-sensing system, ultrasonic level transmitter or any other sensor that produces a linear, level-proportional analog output.

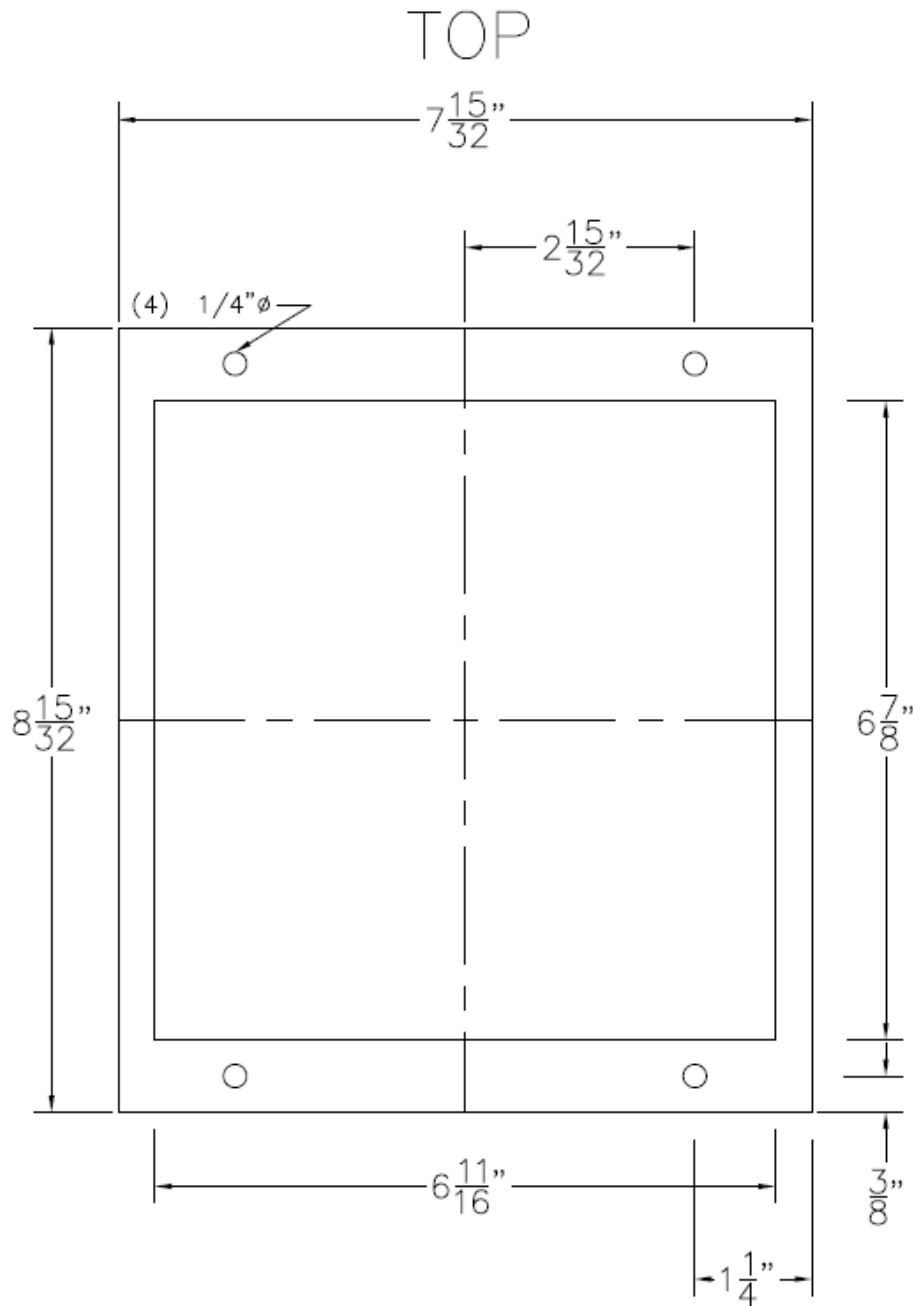
The **NE152** comes complete with built-in duplex alternator allowing pump sequencing in fixed or alternating modes. Sequence selections allow equalization of pump usage or, in conjunction with setpoint positioning can be used to take a pump out of service. Pump sequence selection is viewable and adjustable through the front mounted 3-position toggle switch.

The **NE152** controller is easily interfaced with motor starter pilot or station alarm circuitry through built-in relay contact closure outputs rated at 10 amps @ 120VAC.

The **NE152** controller operates on 120VAC power and provides 13.8 VDC @ 250mA off-board power to power peripheral devices including alarm horns or interposing relays. All wiring terminations are located on the back of the controller with compression-type terminal blocks capable of securing two or fewer 12 AWG wires. The controller is UL-listed.

Installation

The NE152 mounts on a control panel door or inner swing panel. Be sure to secure the mounting studs with the included washers and nuts. See dimensions below (Scaled cut out can be found in the back of the manual):



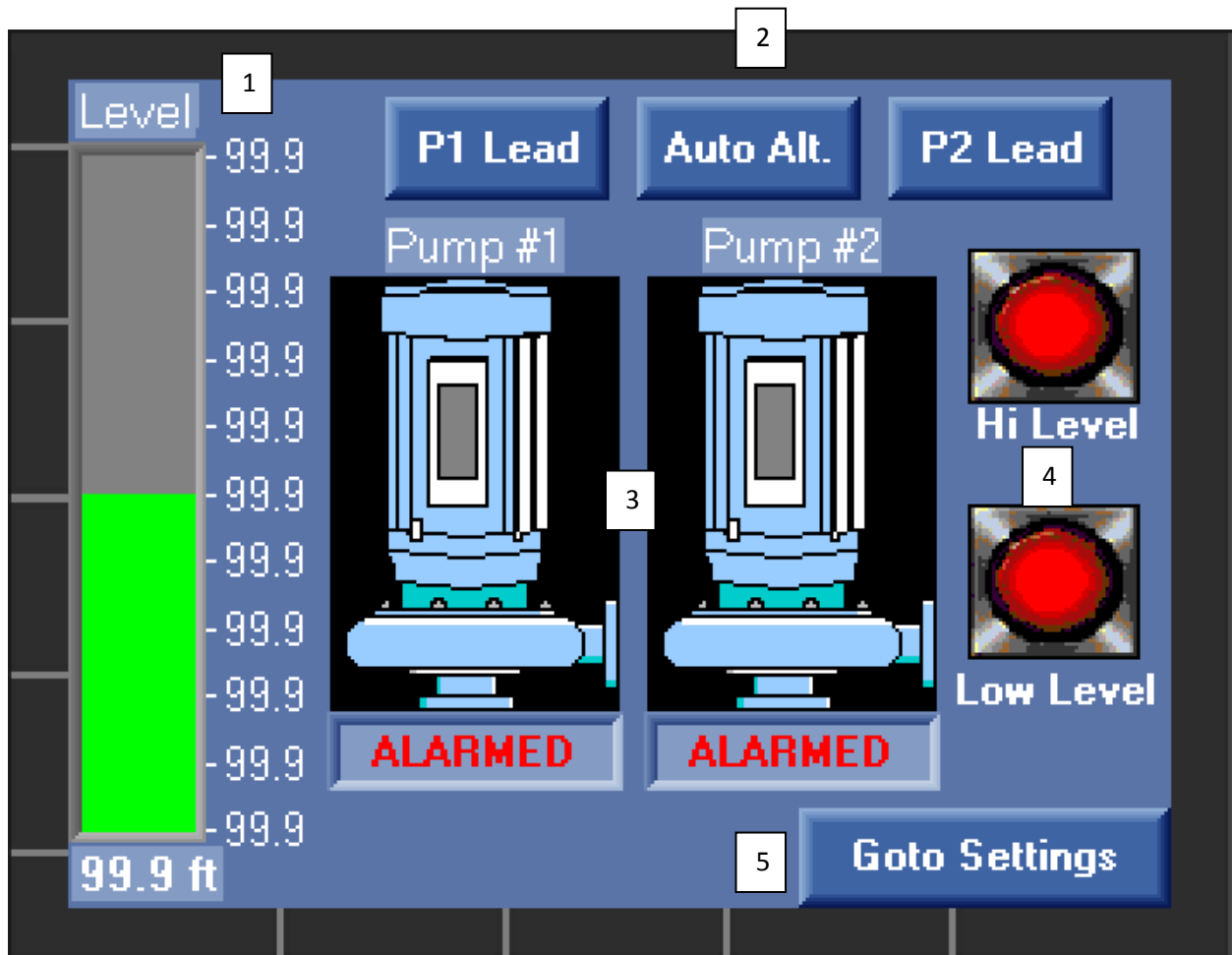
Not To Scale

Operation



On the front of the NE152 there are 4 buttons, “Lower Level”, “Raise Level”, “ACK Alarm”, and “Help” that allow the user to interact with the system. A short description of each button is listed below.

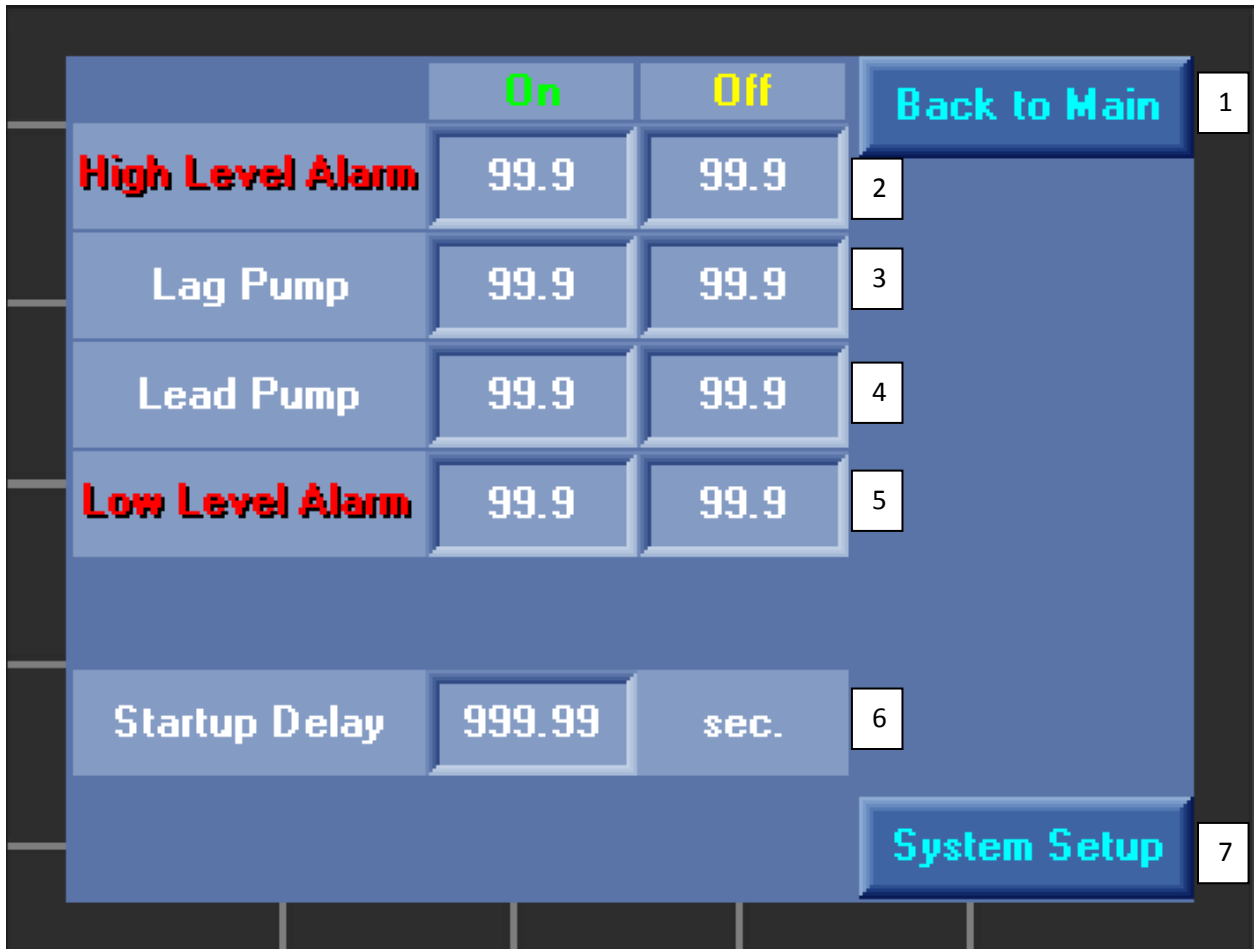
1. Lower Level – Manually lowers the level displayed on the main screen by 1FT/sec while the button is being held. Once the button is released, the displayed level will return to the value being read by the transducer.
2. Raise Level – Manually raises the level displayed on the main screen by 1FT/sec while the button is being held. Once the button is released, the displayed level will return to the value being read by the transducer.
3. ACK Alarm - If an alarm is present and the ACK Alarm button is pressed, the horn will be silence.
4. Help - The Help button will change screens and display information to assist the user with operating the NE152.



Main Screen

The Main Screen will display the current status of the system.

1. Bar Graph – The bar graph displays the current level from the transmitter and can be scaled by going to the System Setup Screen.
2. Control Sequence - The user is able to select a lead/lag sequence for the pumps. If “P1 Lead” is selected then pump 1 will also come on first. If “P2 Lead” is selected then pump 2 will also come on first. If “Auto Alt.” is selected then pumps will alternate after each pump down cycle. The on/off setpoints for the pump can be changed on the settings page.
3. Pump Status – Displays the current status if each pump. The display has four states, “Lead Ready”, “Lag Ready”, “Running”, and “Alarmed”.
4. Alarm Level Indicators – If a high or low level alarm present then the corresponding light will illuminate.
5. Goto Settings – Changes to the Settings Screen.



Settings Screen

The setting screen allows the user to adjust alarm setpoints, lead/lag setpoints, and startup delay.

1. Back to Main – Returns the user to the main screen.
2. High Level Alarm – On: This is the water level in the well above which a High Level Alarm will turn on. This will turn on the Common Alarm relay and trigger the External Audible Alarm.

High Level Alarm – Off: This is the level in the well below which a High Level Alarm will reset. If a High Level Alarm is turned on, it will remain on until the level drops below this value.

3. Lag Pump – On: This is the level in the well above which the Lag Pump will turn on. This value should be greater than or equal the Lead Pump – On setpoint and typically less than the High Level Alarm – On setpoint.

Lag Pump – Off: This is the level in the well below which the Lag Pump will turn off if it is already running. For pump down applications, this value should be less than the Lag Pump – On setpoint.

4. Lead Pump – On: This is the level in the well above which the Lead Pump will turn on. This value should be less than or equal to the Lag Pump – On setpoint, and greater than the Low Level Alarm – On setpoint.

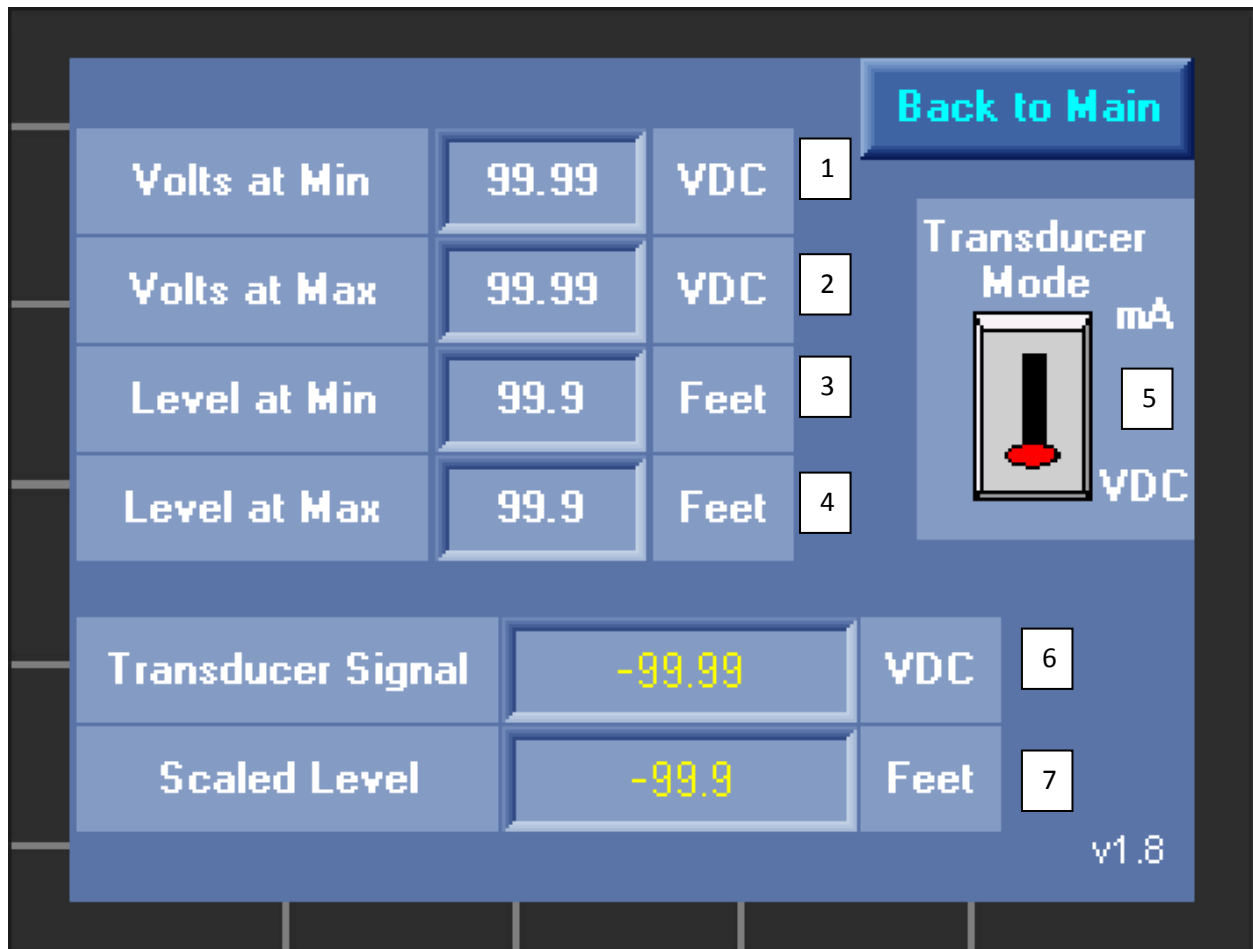
Lead Pump – Off: This is the level in the well below which the Lead Pump will turn off if it is already running. For pump down applications, this value should be less than the Lead Pump – On setpoint.

5. Low Level Alarm – On: This is the level in the well below which the Low Level Alarm will turn on. This will turn on the Common Alarm relay and trigger the External Audible Alarm.

Low Level Alarm – Off: This is the level in the well above which the Low Level Alarm will reset. If a Low Level Alarm is turned on, it will remain on until the level rises above this value.

6. Lag Startup Delay: In the event that both the Lead Pump and the Lag Pump are called to start at the same time, such as after a power outage with a high level in the well, the Lag Pump will delay startup for this amount of time to prevent overloading the supply power. The factory default for this parameter is 15.00 seconds.

7. System Setup – Changes the screen to System Setup



System Setup Screen

The System Setup Screen allows the user to adjust the scaling of the transmitter and the type of transmitter the system is using.

1. Volts at Min - This is the current signal when the liquid level is at its minimum. It is dependent on the transducer type, and will typically be 4 mA, 0 mA, or 1 Volt.
2. Volts at Max - This is the signal when the liquid level is at its maximum. It will typically be 20 mA or 5 Volts.
3. Level at Min - This is the level that the transducer will read when there is no liquid present (typically 0 Feet).
4. Level at Max - This is the full scale level of the transducer. For a 5 psi transducer it would be 11.5 Feet. For a 15 psi transducer it would be 34.6 Feet.
5. Transducer Mode Toggle Switch: - This switch allows the operator to select the type of signal being used. This is set based on the transducer type being used.
6. Transducer Signal: This displays the raw signal being received from the transducer. If this value does not read in the range of your transducer's output (i.e. between 1 – 5 volts or 4 – 20 mA), check the transducer wiring.
7. Scaled Level - This displays what the raw signal is being scaled to for a level reading based on the scaling parameters listed above.

Initial Setup

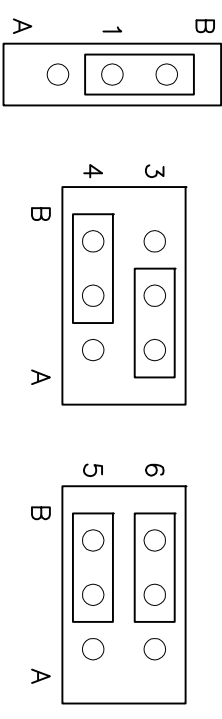
1. Enter System Setup Screen by touching "Goto Settings" then "System Setup" buttons.
2. Set "Volts at Min", "Volts at Max", "Level at Min" and "Level at Max" settings to match specifications on transducer being used.
3. Verify "Scaled Level" reading is correct based on the depth of liquid in the well.
4. Touch "Back to Main" and then "Goto Settings" to enter level settings screen.
5. Enter "Low Level Alarm", "Lead Pump", "Lag Pump", and "High Level Alarm" settings based on jumper placement from D152.
6. Touch "Back to Main" to return to the main screen.
7. Select desired alternation setting by touching one of the three buttons across the top of the screen.
8. Control can be testing by manually varying the level using the "Lower Level" and "Raise Level" buttons below the screen. Holding one of the buttons will change the level 1.0ft per second.
9. Test external alarm horn (if equipped by simulating a high or low level alarm. The alarm can be silenced by pushing the "ACK Alarm" button, using the external silence contact, or if the level returns to a non-alarm state.
10. Monitor control for a few pump-down cycles to be sure everything is working correctly.

REVISIONS

REV.	DATE	BY	CHKD	DESCRIPTION
0	4/26/11	BAS		PROTOTYPE
1	12/16/11	JAC		ADDED JUMPER NOTE
2	7/6/12	RAP		ADDED 4-20mA SIGNAL IN, FACTORY SETTINGS, BUTTON LABEL, UPDATED WIRING TERMINALS

FACTORY SETTINGS

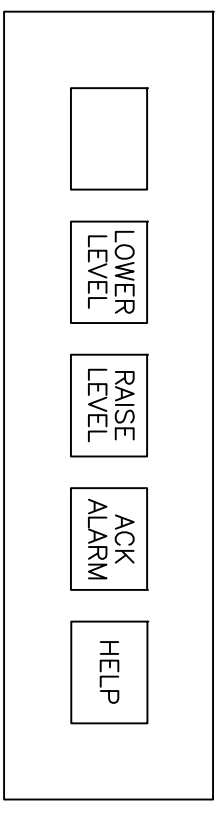
HIGH LEVEL	9	SET	RESET	8.5
LAG PUMP	7			4
LEAD PUMP	6			3
LOW LEVEL	1			1.5
START UP DELAY	15			SEC
V @ MIN	1			
V @ MAX	5			
LEVEL @ MIN	0			
LEVEL @ MAX	10			
PUMP AUTO ALTERNATE				



JUMPER SETTINGS

TRANSUCER CONNECTIONS	
GROUND	120VAC PUMP1
L1 N	50/60HZ START
G	80VA
1	START
2	START
3	ALARM
4	START
5	START
6	START
7	ALARM
8	ALARM
9	ALARM
10	EXTERNAL SILENCE
11	EXTERNAL AUDIBLE DRIVER (24VDC)
12	+24 VDC OUT
13	COMMON
14	SIGNAL IN VDC (WHT)
15	EXCITATION (RED)
16	SIGNAL COM (BLK)
17	SIGNAL IN mA (WHT)
G	GROUND

FIELD WIRING TERMINALS



BUTTON LABELS

NOTE 1: CONNECT MOMENTARY PUSH BUTTON TO TERMINALS 10 AND 12 FOR EXTERNAL SILENCE

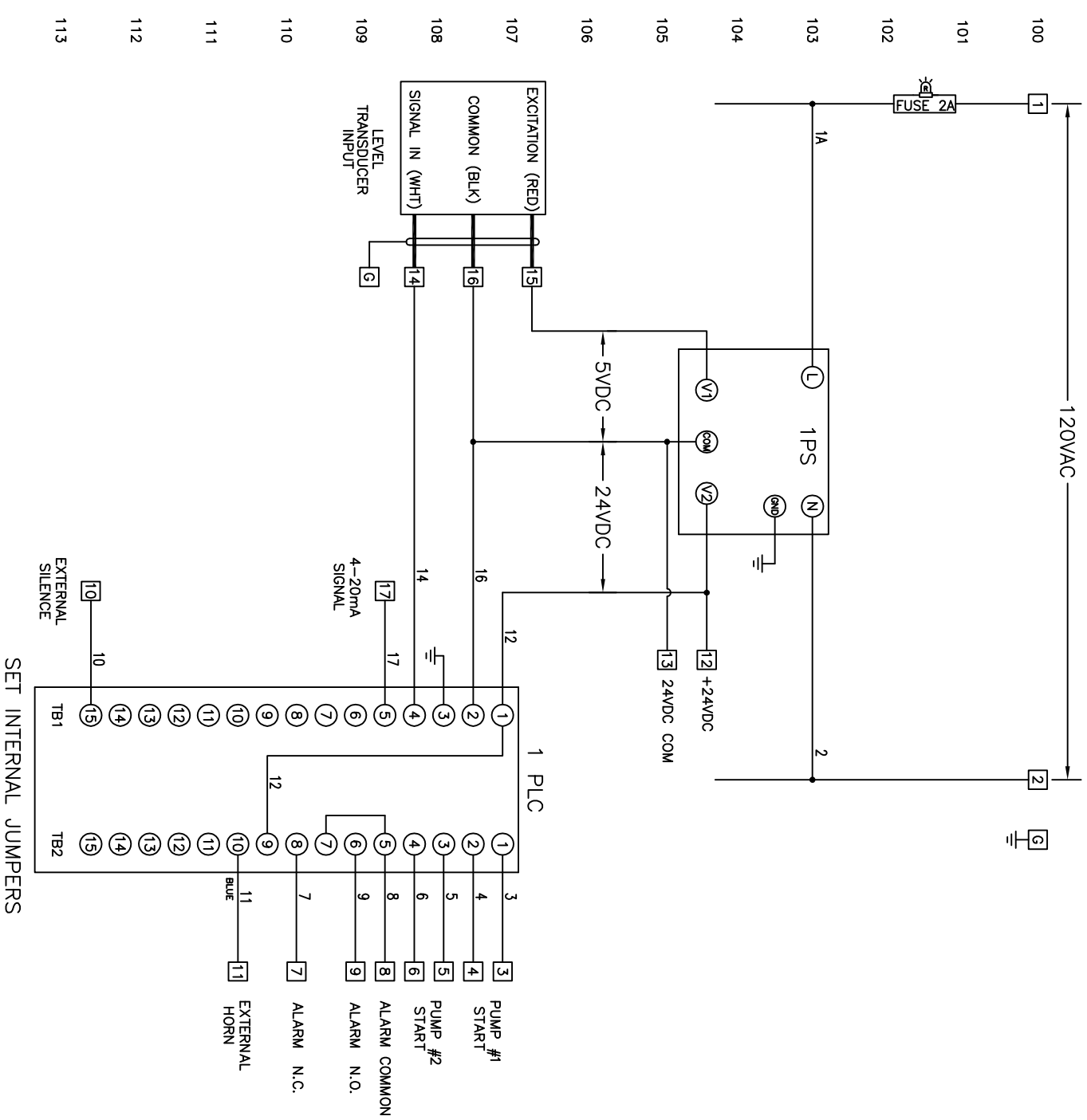
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NE152 CONTROLLER ELECTRIC SCHEMATIC

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FUSE 2A

1A

2

1

120VAC

1

- COMPONENT WIRING
- FIELD WIRING TERMINALS
- CUSTOMER WIRING