



# NXF4000 Wiring Application Guide

## CAPABILITIES OF THE NXF4000

For most applications the NXF4000 can be adapted to work. Alternative configurations are listed below for special options.

- Revert to pilot – Use a PPC4000 with YB110 and YP118 or YP138 programmer
- Flame rod – Use a PPC4000 with YB110 and YP1xx programmer or BP110UVFR-Sx(M)(P)
- UV and flame rod simultaneously – Use a PPC4000 with BP110UVFR-Sx(M)(P)
- Ultraviolet self-check – Use a PPC4000 with YB110UVSC and YP1xx programmer
- Expanded annunciation – Use a PPC4000 with YB110, YP1xx programmer and YZ300 annunciator

## IMPORTANT NOTES ABOUT WIRING DIAGRAMS

1. Wiring diagrams are generic. Where there are multiple options, these are outlined so that one can be chosen (such as for a steam or a water limit option).
2. Up to ten servos can be connected. Up to four servos can be used with a specific profile. The wiring example shows five servos connected with the last two receiving power from an external power supply. The internal power supply for the servos can supply up to 60W of power, so the need for an external power supply entirely depends upon the power requirements of the connected servos. The power requirements are as follows: FX04 (7.5W), FX20 (35W) and FX50 (38W). If there were three FX04 and two FX20 servos in a system, this would total 92.5W. This is in excess of the available 60W. The two options in this scenario would be to either put all five servos on an external 120W power supply or to put the three FX04 servos and one FX20 servo on the internal power supply and put the remaining FX20 servo on an external 60W power supply.
3. Digital input 1 is used for the Burner On/Off switch. This must be programmed as *DIGITAL INPUT SETUP → DI 1 → USE = BURNER CONTROL*. If the burner control switch on the NXD410 or NXD410TS (user interface) is to be used as well set *DIGITAL INPUT SETUP → DI 1 → ACTION = AND*. The burner control switch on the user interface must also be enabled by programming *KEYPAD SETUP → BURNER ON/OFF = USED*. Note that other inputs can be used for this function – this is just the one depicted in the wiring diagrams.
4. If valve proving is used, digital inputs 7 and 8 are used for this function. This must be programmed as *DIGITAL INPUT SETUP → DI 7 → USE = GVP NORM. OPEN*. The profile assignment must be programmed as *DIGITAL INPUT SETUP → DI 7 → ASSIGNMENT = (profiles to apply valve proving to)*. Also program *DIGITAL INPUT SETUP → DI 8 → USE = GVP NORM. CLOSED* and *DIGITAL INPUT SETUP → DI 8 → ASSIGNMENT = (profiles to apply valve proving to)*. Note that other inputs can be used for these functions – these are just the ones depicted in the wiring diagrams.



## NXF4000 Wiring Application Guide

### IMPORTANT NOTES ABOUT WIRING DIAGRAMS (CONTINUED)

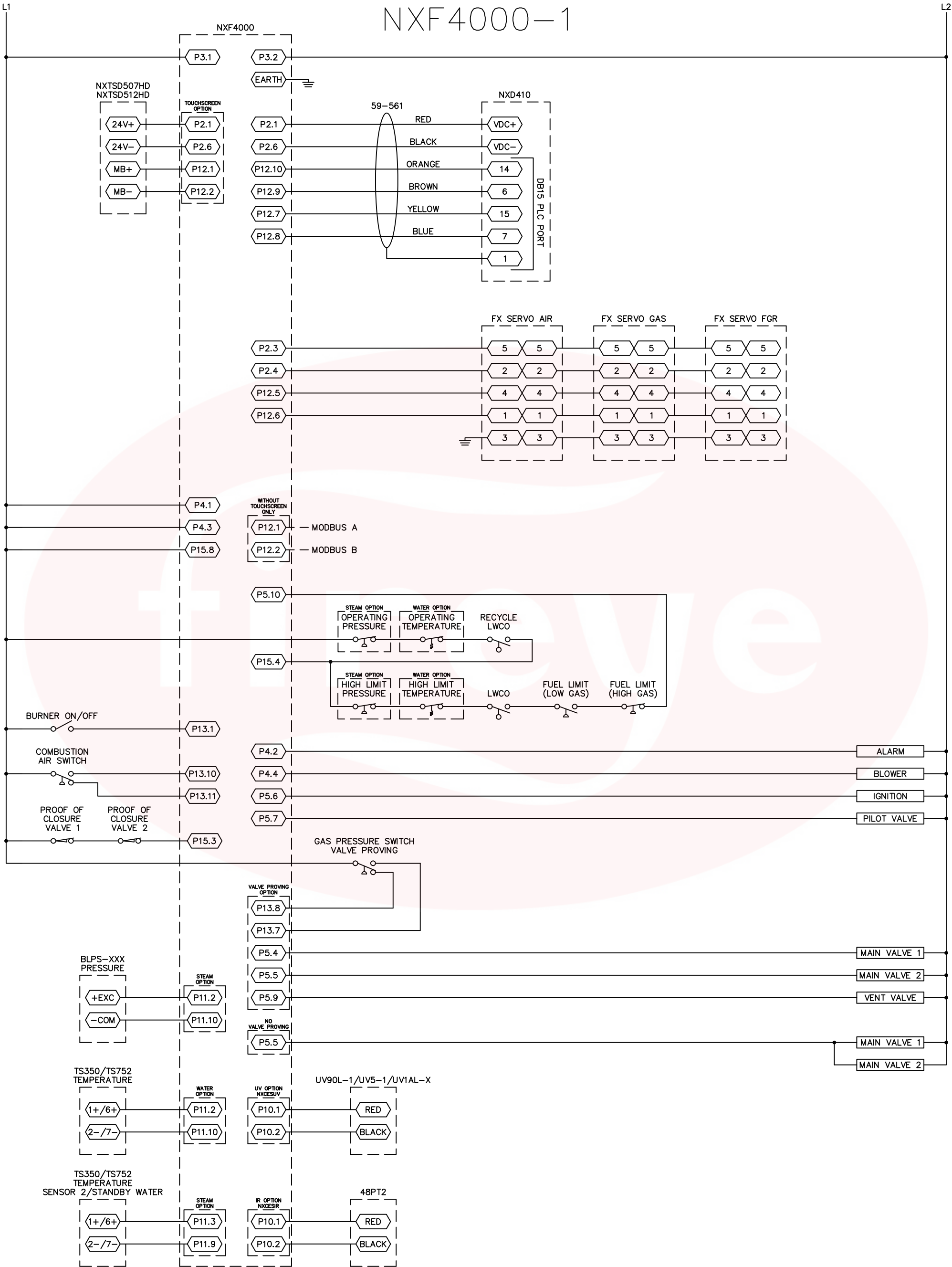
5. Digital inputs 10 and 11 are used to monitor the combustion air switch. This also includes a check that the switch changes states to off when the burner is idle. This must be programmed as *DIGITAL INPUT SETUP → DI 10 → USE = AIRFLOW N. OPEN*. Also program *DIGITAL INPUT SETUP → DI 11 → USE = AIRFLOW N. CLOSED*. Note that other inputs can be used for these functions – these are just the ones depicted in the wiring diagrams.
6. Digital input 15 is used for the fuel valve end switches (proof of closure). This must be programmed as *DIGITAL INPUT SETUP → DI 15 → USE = FVES/POC*. The profile assignment must be programmed as *DIGITAL INPUT SETUP → DI 15 → ASSIGNMENT = (profiles to apply valve proving to)*. Note that other inputs can be used for this function – this is just the one depicted in the wiring diagrams.
7. If a normally open vent valve is connected in a double block and bleed arrangement, a separate terminal is provided to control the vent valve if valve proving is enabled. Using this terminal is required for the valve proving operation to work correctly. Enable this terminal by programming *BURNER CNTRL SETUP → VALVE PROVING → METHOD = 3-VALVE (NO)*. If valve proving is not used, the vent valve should be connected in parallel to the gas valves (total load must be under 575VA).
8. Fuel selection between gas and oil is shown using a single switch connected to a relay. This could also be done directly via a multi-pole switch.
9. When using direct spark with oil, program the oil profile as a gas fuel and connect the main oil valve(s) to terminal P5.4 (normally used for the upstream gas valve). If there are both gas and oil profiles, the output from this terminal must be switched with a relay or selector to the correct valves. Another option when using direct spark is to program the oil profile as an oil fuel, but program the pilot as intermittent (*BURNER CNTRL SETUP → PILOT = INTERMITTENT*) and connect the main oil valve(s) to terminal P5.7 (normally used for the pilot valve). The second option doesn't work when both gas and oil profiles are used because the pilot type is a global setting for all profiles.
10. The optional NXTSD507HD (7") or NXTSD512HD (12") touchscreens use the external Modbus connection for communication. When these screens are connected, this connection is not available for use.
11. Connecting a VFD to the NXF4000 requires the addition of the NXCESVFD add-on card.
12. **Diagrams are optimized to print at 11x17 size or larger.**

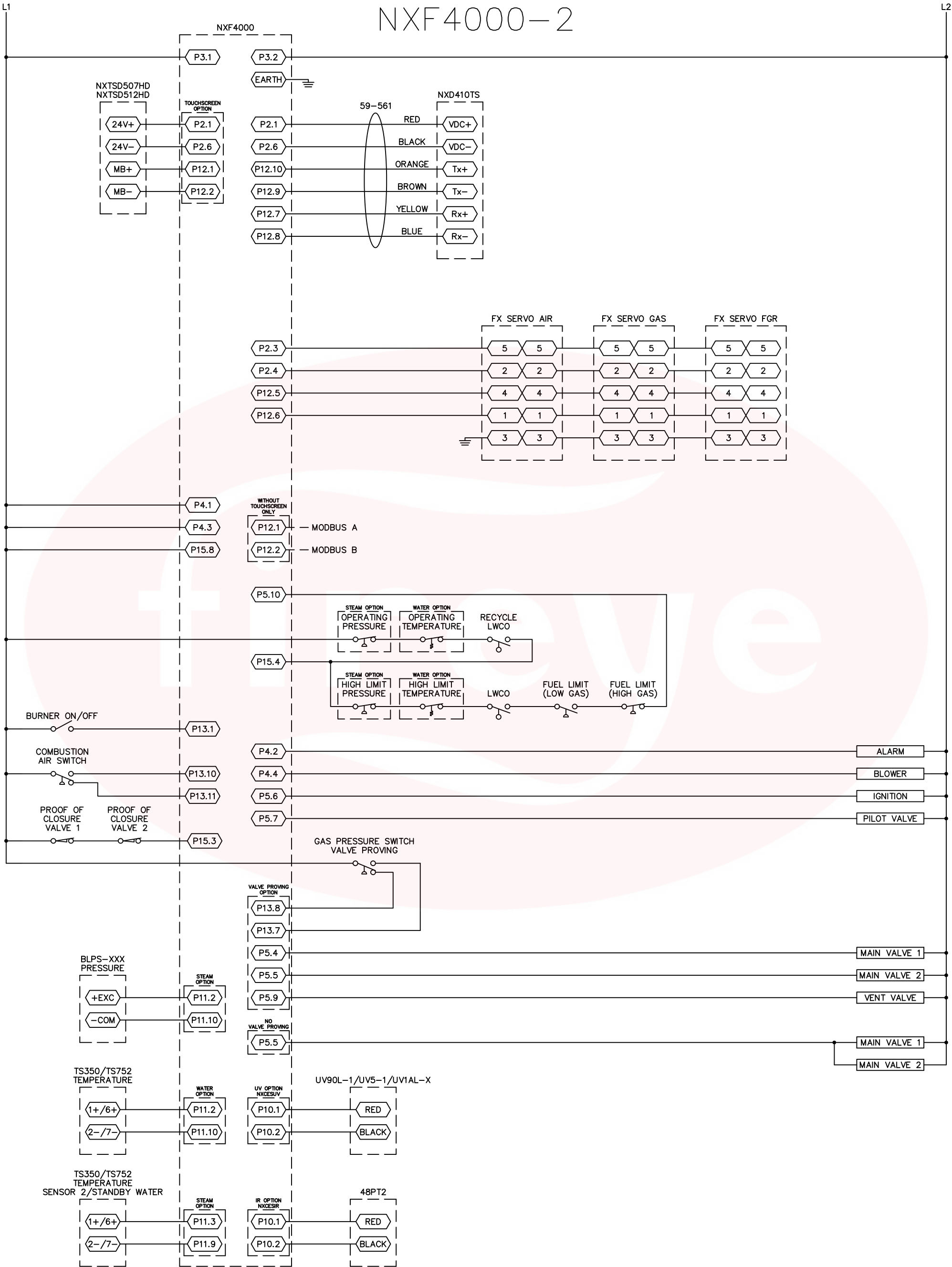


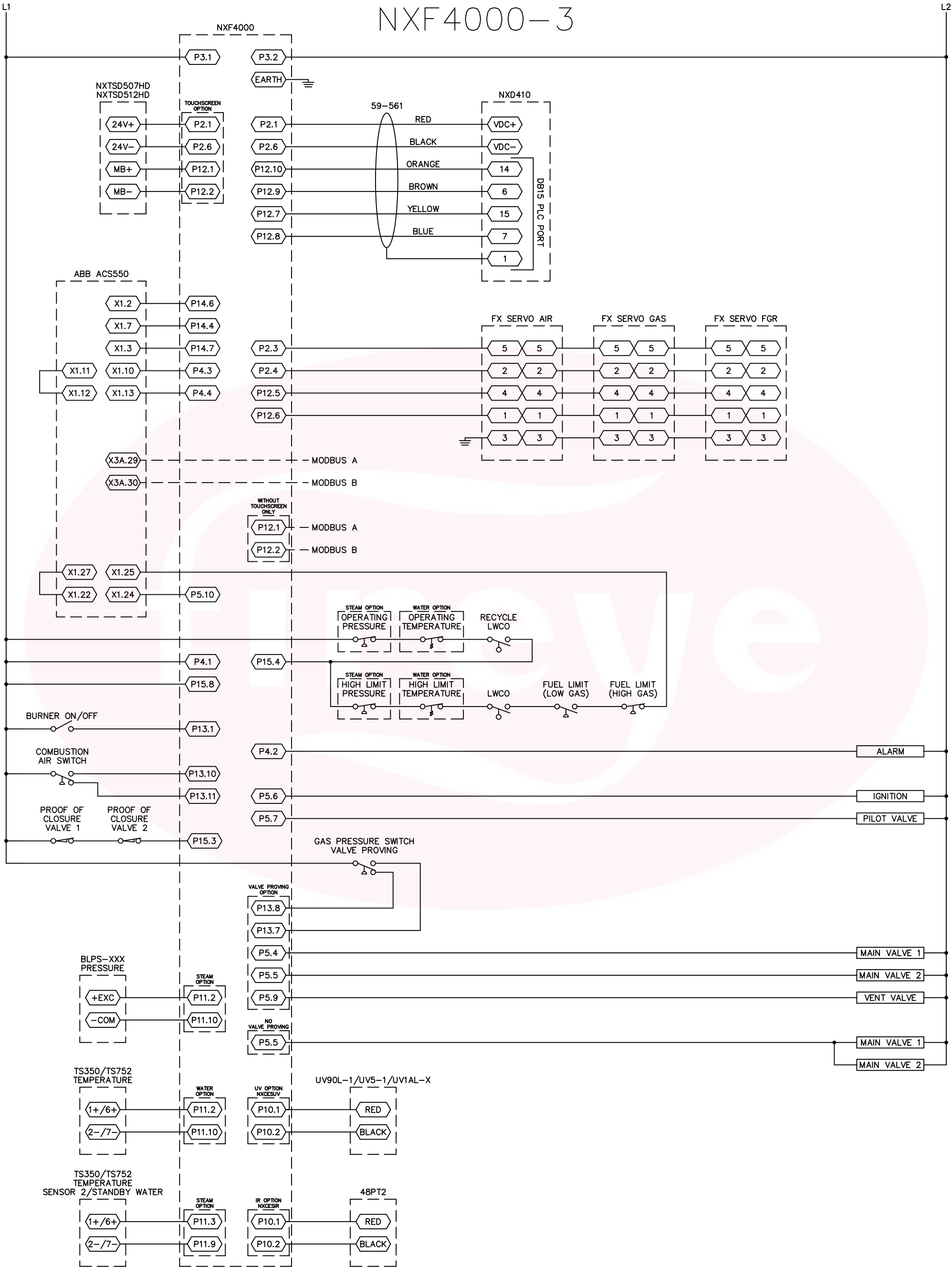
# NXF4000 Wiring Application Guide

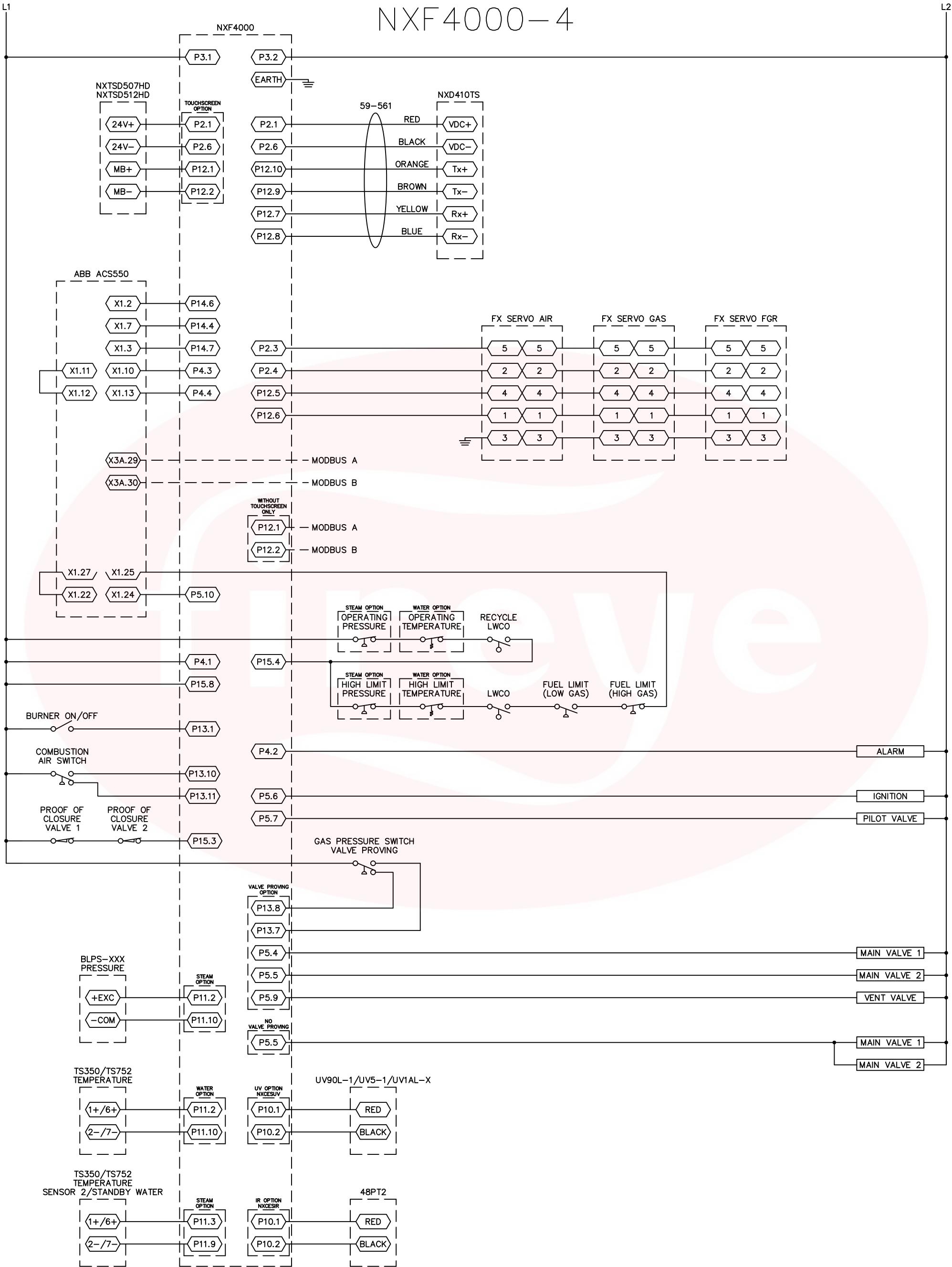
## WIRING DIAGRAMS BY FEATURE

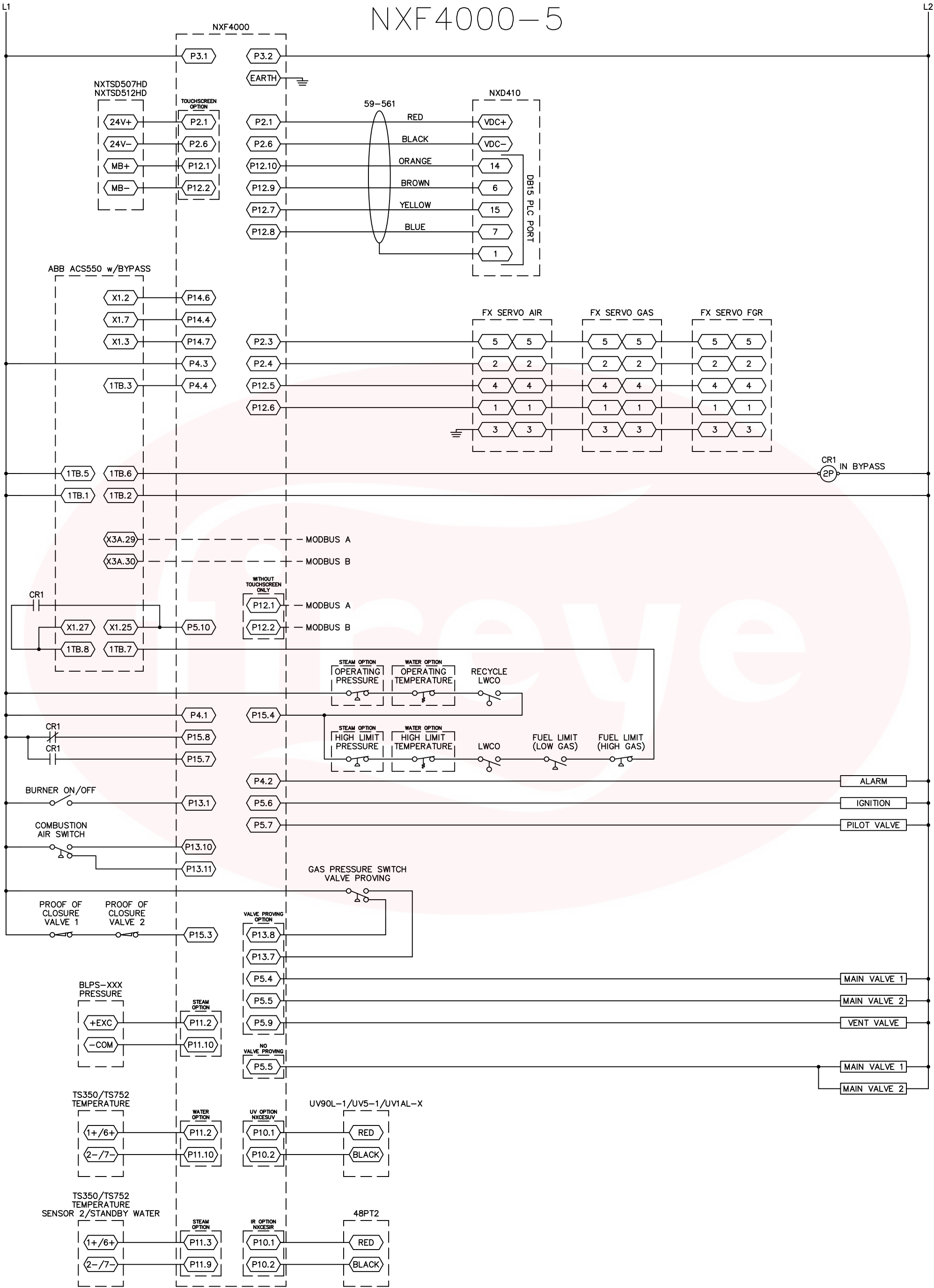
| Diagram Number | User Interface | O <sub>2</sub> | VFD    | VFD Bypass | Dual Fuel |
|----------------|----------------|----------------|--------|------------|-----------|
| NXF4000-1      | NXD410         | ---            | ---    | ---        | ---       |
| NXF4000-2      | NXD410TS       | ---            | ---    | ---        | ---       |
| NXF4000-3      | NXD410         | ---            | ACS550 | ---        | ---       |
| NXF4000-4      | NXD410TS       | ---            | ACS550 | ---        | ---       |
| NXF4000-5      | NXD410         | ---            | ACS550 | Yes        | ---       |
| NXF4000-6      | NXD410TS       | ---            | ACS550 | Yes        | ---       |
| NXF4000-7      | NXD410         | NXCESO2        | ACS550 | ---        | Yes       |
| NXF4000-8      | NXD410         | FXO2TRIM-1     | ACS550 | ---        | Yes       |
| NXF4000-9      | NXD410TS       | NXCESO2        | ACS550 | ---        | Yes       |
| NXF4000-10     | NXD410TS       | FXO2TRIM-1     | ACS550 | ---        | Yes       |
| NXF4000-11     | NXD410         | NXCESO2        | ACS550 | Yes        | Yes       |
| NXF4000-12     | NXD410         | FXO2TRIM-1     | ACS550 | Yes        | Yes       |
| NXF4000-13     | NXD410TS       | NXCESO2        | ACS550 | Yes        | Yes       |
| NXF4000-14     | NXD410TS       | FXO2TRIM-1     | ACS550 | Yes        | Yes       |

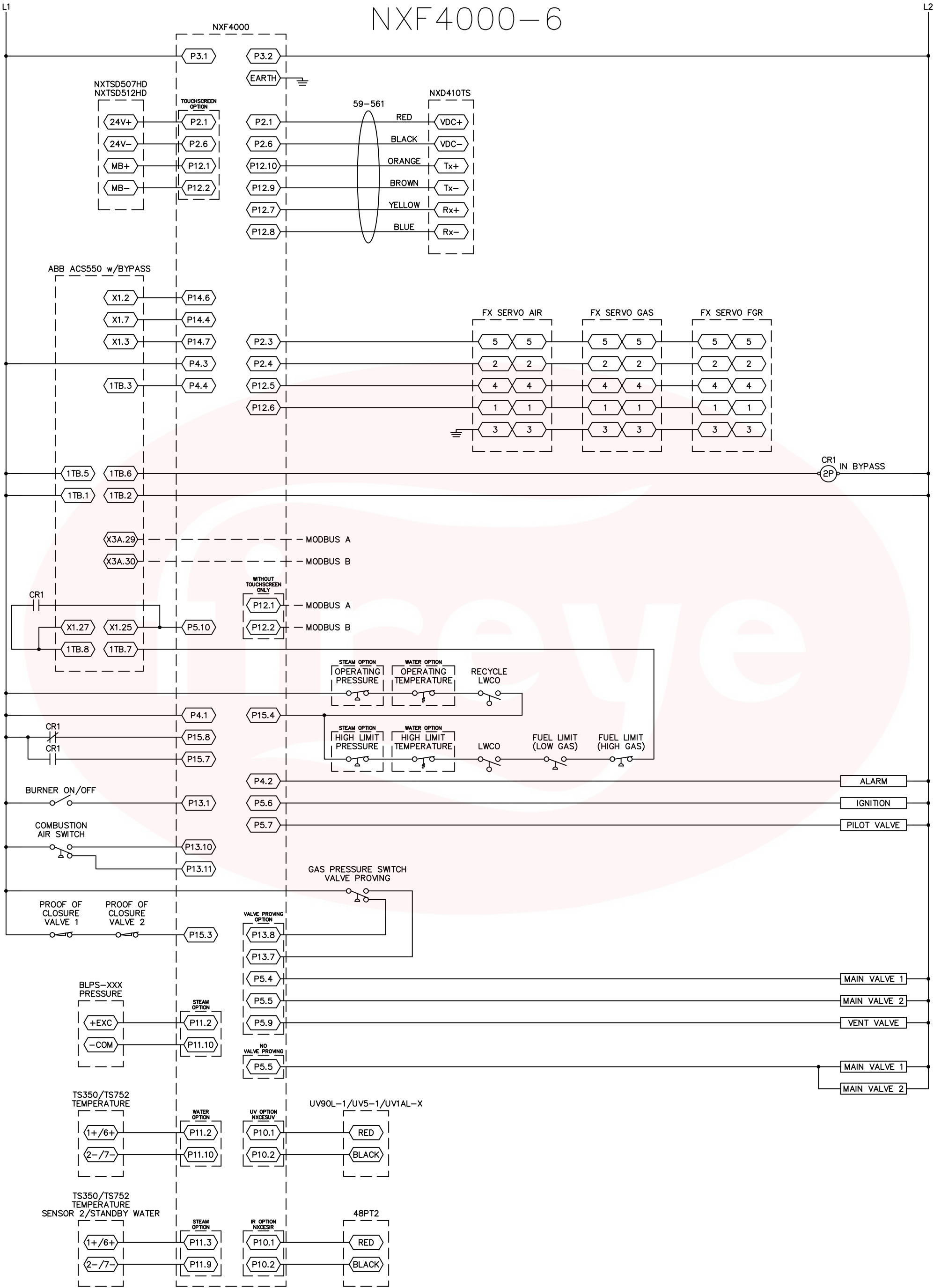


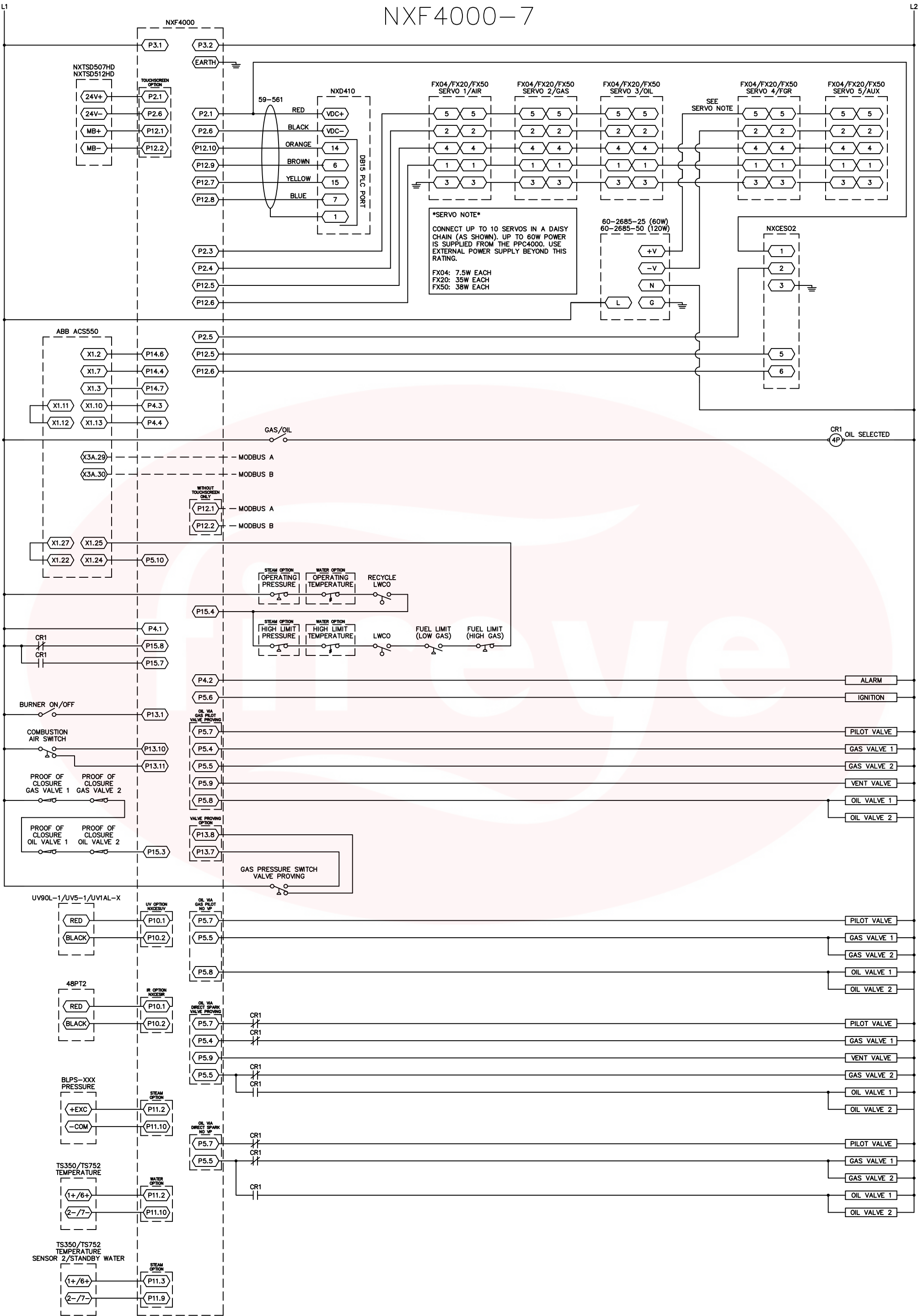


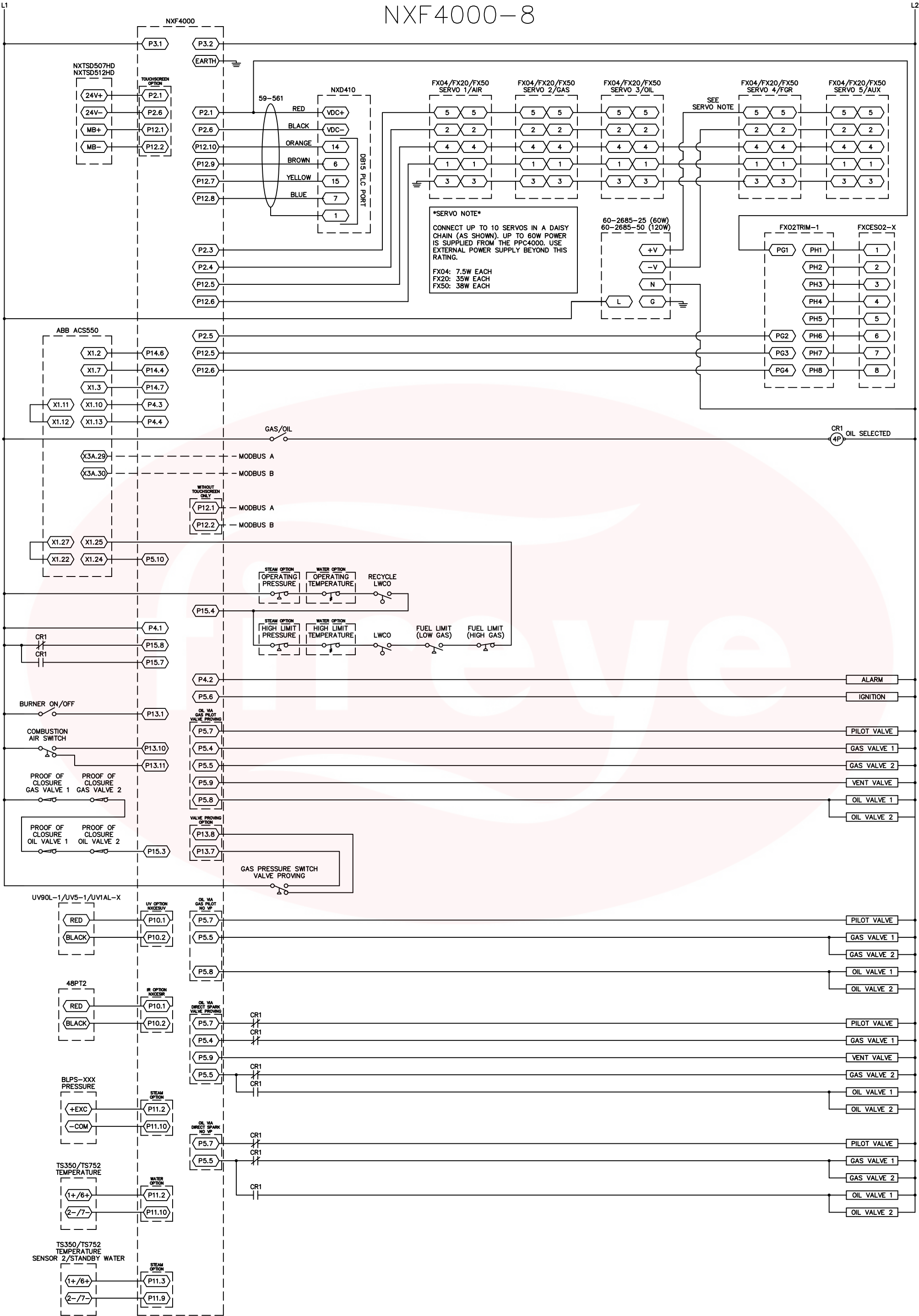


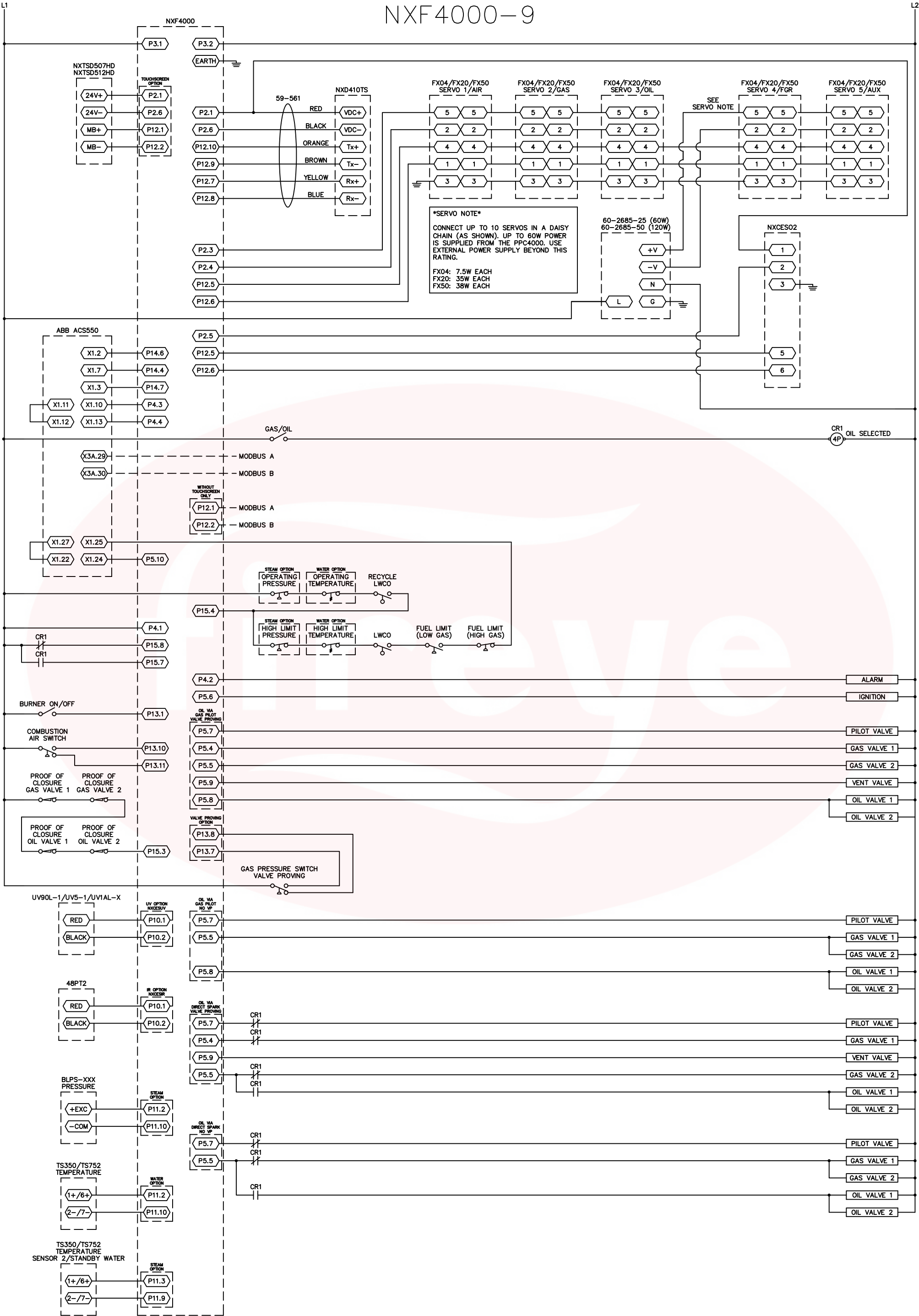


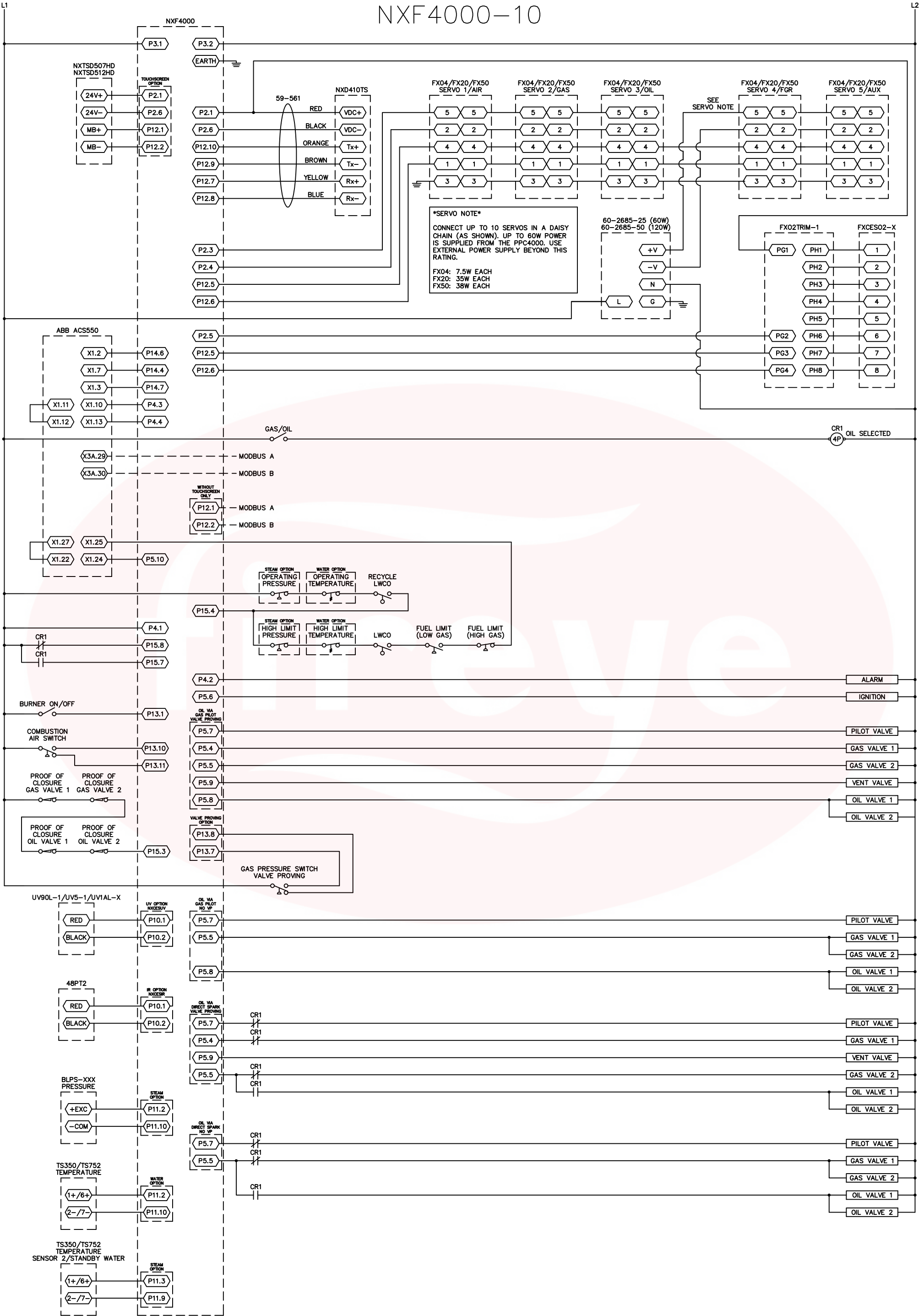


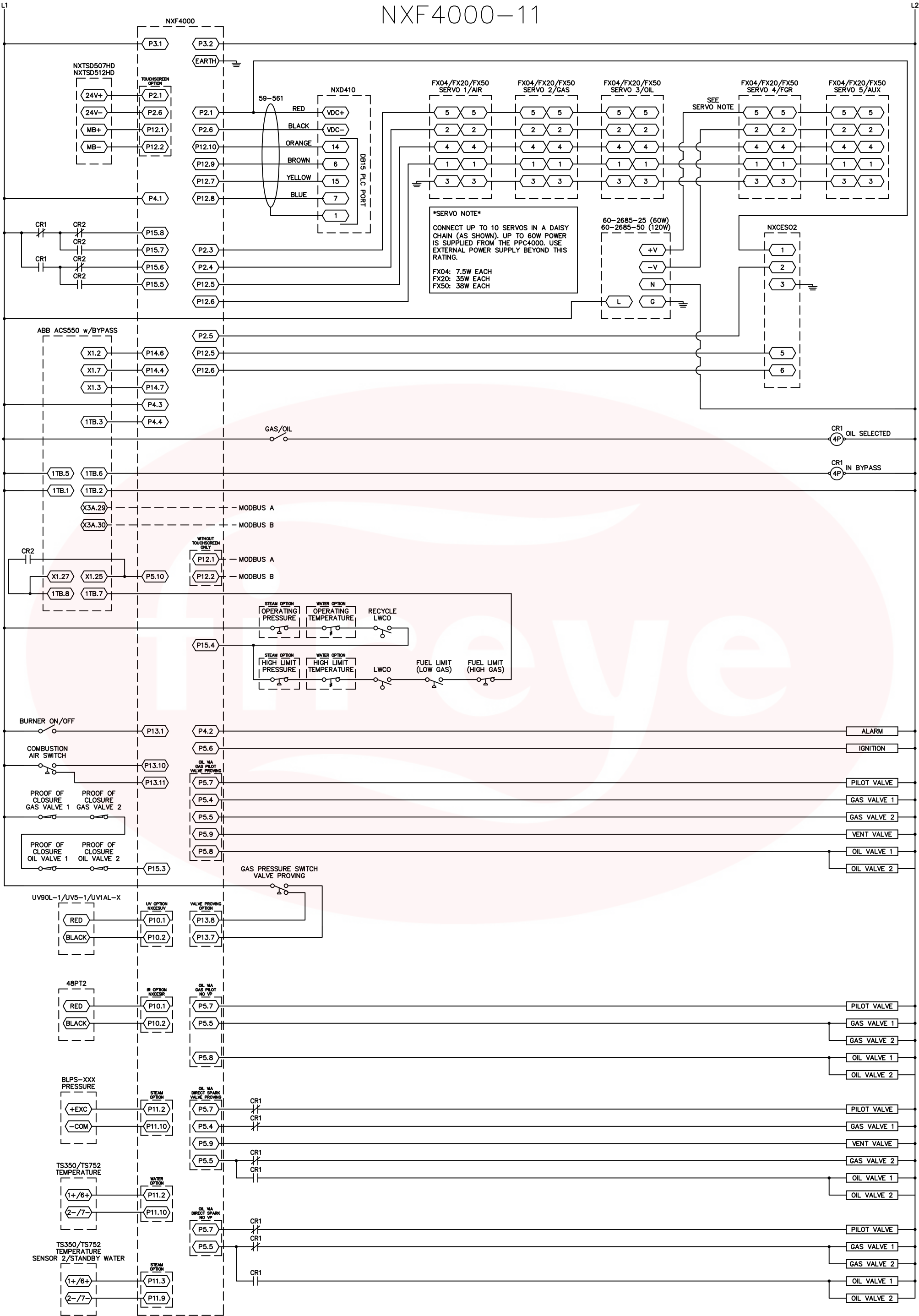












The diagram illustrates the wiring for a DB15 PLC port, showing connections for power, ground, and various sensors and actuators. The terminal block is labeled P1.1 through P1.15. The DB15 connector is labeled DB15 PLC PORT. The wiring includes a 24VDC power supply, ground, and various sensors including pressure, temperature, and flow. It also shows connections for actuators like valves and solenoids. A large 'Save' watermark is visible across the center of the diagram.

**Terminal Block Connections:**

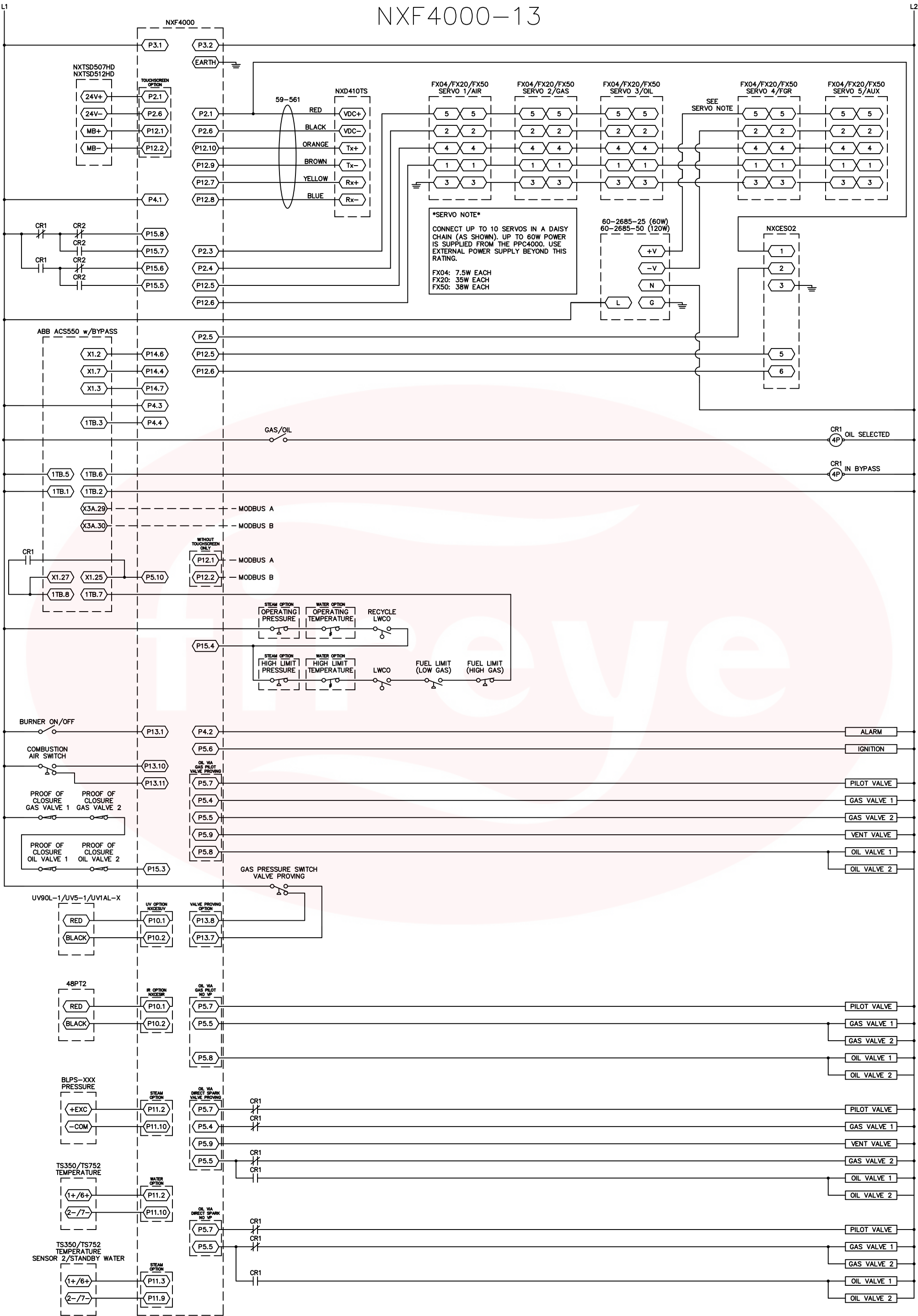
- P1.1: 24V+
- P1.2: 24V-
- P1.3: MB+
- P1.4: MB-
- P1.5: P15.8
- P1.6: P15.7
- P1.7: P15.6
- P1.8: P15.5
- P1.9: P2.3
- P1.10: P2.4
- P1.11: P12.5
- P1.12: P12.6
- P1.13: P2.5
- P1.14: P12.5
- P1.15: P12.6

**DB15 PLC PORT Connections:**

- 1: RED (VDC+)
- 2: BLACK (VDC-)
- 3: ORANGE (14)
- 4: BROWN (6)
- 5: YELLOW (15)
- 6: BLUE (7)
- 7: 1

**Sensors and Actuators:**

- Pressure Sensors:** P15.4, P15.5, P15.6, P15.7, P15.8, P15.9, P15.10, P15.11, P15.12, P15.13, P15.14, P15.15, P15.16, P15.17, P15.18, P15.19, P15.20, P15.21, P15.22, P15.23, P15.24, P15.25, P15.26, P15.27, P15.28, P15.29, P15.30, P15.31, P15.32, P15.33, P15.34, P15.35, P15.36, P15.37, P15.38, P15.39, P15.40, P15.41, P15.42, P15.43, P15.44, P15.45, P15.46, P15.47, P15.48, P15.49, P15.50, P15.51, P15.52, P15.53, P15.54, P15.55, P15.56, P15.57, P15.58, P15.59, P15.60, P15.61, P15.62, P15.63, P15.64, P15.65, P15.66, P15.67, P15.68, P15.69, P15.70, P15.71, P15.72, P15.73, P15.74, P15.75, P15.76, P15.77, P15.78, P15.79, P15.80, P15.81, P15.82, P15.83, P15.84, P15.85, P15.86, P15.87, P15.88, P15.89, P15.90, P15.91, P15.92, P15.93, P15.94, P15.95, P15.96, P15.97, P15.98, P15.99, P15.100, P15.101, P15.102, P15.103, P15.104, P15.105, P15.106, P15.107, P15.108, P15.109, P15.110, P15.111, P15.112, P15.113, P15.114, P15.115, P15.116, P15.117, P15.118, P15.119, P15.120, P15.121, P15.122, P15.123, P15.124, P15.125, P15.126, P15.127, P15.128, P15.129, P15.130, P15.131, P15.132, P15.133, P15.134, P15.135, P15.136, P15.137, P15.138, P15.139, P15.140, P15.141, P15.142, P15.143, P15.144, P15.145, P15.146, P15.147, P15.148, P15.149, P15.150, P15.151, P15.152, P15.153, P15.154, P15.155, P15.156, P15.157, P15.158, P15.159, P15.160, P15.161, P15.162, P15.163, P15.164, P15.165, P15.166, P15.167, P15.168, P15.169, P15.170, P15.171, P15.172, P15.173, P15.174, P15.175, P15.176, P15.177, P15.178, P15.179, P15.180, P15.181, P15.182, P15.183, P15.184, P15.185, P15.186, P15.187, P15.188, P15.189, P15.190, P15.191, P15.192, P15.193, P15.194, P15.195, P15.196, P15.197, P15.198, P15.199, P15.200, P15.201, P15.202, P15.203, P15.204, P15.205, P15.206, P15.207, P15.208, P15.209, P15.210, P15.211, P15.212, P15.213, P15.214, P15.215, P15.216, P15.217, P15.218, P15.219, P15.220, P15.221, P15.222, P15.223, P15.224, P15.225, P15.226, P15.227, P15.228, P15.229, P15.230, P15.231, P15.232, P15.233, P15.234, P15.235, P15.236, P15.237, P15.238, P15.239, P15.240, P15.241, P15.242, P15.243, P15.244, P15.245, P15.246, P15.247, P15.248, P15.249, P15.250, P15.251, P15.252, P15.253, P15.254, P15.255, P15.256, P15.257, P15.258, P15.259, P15.260, P15.261, P15.262, P15.263, P15.264, P15.265, P15.266, P15.267, P15.268, P15.269, P15.270, P15.271, P15.272, P15.273, P15.274, P15.275, P15.276, P15.277, P15.278, P15.279, P15.280, P15.281, P15.282, P15.283, P15.284, P15.285, P15.286, P15.287, P15.288, P15.289, P15.290, P15.291, P15.292, P15.293, P15.294, P15.295, P15.296, P15.297, P15.298, P15.299, P15.300, P15.301, P15.302, P15.303, P15.304, P15.305, P15.306, P15.307, P15.308, P15.309, P15.310, P15.311, P15.312, P15.313, P15.314, P15.315, P15.316, P15.317, P15.318, P15.319, P15.320, P15.321, P15.322, P15.323, P15.324, P15.325, P15.326, P15.327, P15.328, P15.329, P15.330, P15.331, P15.332, P15.333, P15.334, P15.335, P15.336, P15.337, P15.338, P15.339, P15.340, P15.341, P15.342, P15.343, P15.344, P15.345, P15.346, P15.347, P15.348, P15.349, P15.350, P15.351, P15.352, P15.353, P15.354, P15.355, P15.356, P15.357, P15.358, P15.359, P15.360, P15.361, P15.362, P15.363, P15.364, P15.365, P15.366, P15.367, P15.368, P15.369, P15.370, P15.371, P15.372, P15.373, P15.374, P15.375, P15.376, P15.377, P15.378, P15.379, P15.380, P15.381, P15.382, P15.383, P15.384, P15.385, P15.386, P15.387, P15.388, P15.389, P15.390, P15.391, P15.392, P15.393, P15.394, P15.395, P15.396, P15.397, P15.398, P15.399, P15.400, P15.401, P15.402, P15.403, P15.404, P15.405, P15.406, P15.407, P15.408, P15.409, P15.410, P15.411, P15.412, P15.413, P15.414, P15.415, P15.416, P15.417, P15.418, P15.419, P15.420, P15.421, P15.422, P15.423, P15.424, P15.425, P15.426, P15.427, P15.428, P15.429, P15.430, P15.431, P15.432, P15.433, P15.434, P15.435, P15.436, P15.437, P15.438, P15.439, P15.440, P15.441, P15.442, P15.443, P15.444, P15.445, P15.446, P15.447, P15.448, P15.449, P15.450, P15.451, P15.452, P15



The diagram illustrates the electrical wiring for the PPC4000 control system, organized into several functional sections:

- Power and Grounding:**
  - Power Supply:** 24V+ and 24V- lines are connected to terminals P2.1 and P2.6. Grounding is established at P3.2 and P12.8.
  - Grounding:** EARTH connection is shown at P3.2.
- Sensors and Inputs:**
  - Temperature Sensors:** TS350/TS752 sensors are connected to P11.2 and P11.10 for water temperature, and P11.3 and P11.9 for standby water temperature.
  - Pressure Sensors:** BLPS-XXX pressure sensors are connected to P11.2 and P11.10.
  - Flow Sensors:** 48PT2 flow sensors are connected to P10.1 and P10.2.
  - UV Sensors:** UV90L-1/UV5-1/UV1AL-X UV sensors are connected to P10.1 and P10.2.
  - Modbus Communication:** MODBUS A and MODBUS B lines are connected to P12.1 and P12.2.
- Actuators and Outputs:**
  - Valves:** Gas valves (GAS VALVE 1, GAS VALVE 2), oil valves (OIL VALVE 1, OIL VALVE 2), and vent valves are controlled via P5.4, P5.5, P5.7, P5.8, P5.9, and P13.10.
  - Pilot Valves:** PILOT VALVE 1 and PILOT VALVE 2 are controlled via P5.7 and P5.8.
  - Ignition:** IGNITION is controlled via P5.6.
  - Alarm:** ALARM is controlled via P4.2.
- Control and Safety:**
  - CR1 (Common Rail 1):** Multiple CR1 lines are shown for safety and control, connected to various terminals like P15.8, P15.7, P15.6, P15.5, P15.4, P15.3, P13.1, P13.10, P13.11, P10.1, P10.2, P11.2, P11.10, P11.3, and P11.9.
  - Interlocks:** Various interlocks are shown, including BURNER ON/OFF, COMBUSTION AIR SWITCH, PROOF OF CLOSURE for gas and oil valves, and FUEL LIMIT (LOW GAS) and FUEL LIMIT (HIGH GAS).
- Optional Modules:**
  - FX04/FX20/FX50 Servos:** Up to 10 servos can be connected in a daisy chain. Power ratings are specified: FX04 (7.5W), FX20 (35W), and FX50 (38W).
  - FX02TRIM-1 and FXCES02-X:** These modules provide additional control and monitoring capabilities.

The diagram uses a color-coded system for wiring, with red, black, orange, brown, yellow, and blue lines representing different signal and power paths. Terminal blocks are labeled with P (Power), X (Communication), and CR (Common Rail).

## R7999/RM7800L/Q7800C (PCB) to NXF4000 Conversion

| RM7800L terminal | Q7800C1001 terminal | Q7800C1001 light panel | R7999 terminal | NXF4000 terminal | Description                              |
|------------------|---------------------|------------------------|----------------|------------------|------------------------------------------|
| 4                | 1                   |                        | 1              | P3.1             | line 120V                                |
| L2               | 2                   |                        | 3              | P3.2             | neutral 120V                             |
| G                | GND                 |                        | 2              | chassis          | physical earth ground                    |
| 4                | CS_B                | black wire             |                | *panel 120V*     | line to limit string                     |
| n/a              | CS_Y                | yellow wire            |                | P13.1            | beginning of operating limit string      |
| 6                | OL2                 |                        | 13             | P15.4            | end of operating limit string            |
| 6                | A1                  |                        |                | P15.4            | line to safety limit string              |
| 7                | A2                  |                        |                | P5.10            | end of safety limit string               |
|                  |                     |                        | 1              | P4.4             | line to fuel select                      |
|                  |                     |                        | 5              | P15.8            | input to select fuel 1/gas               |
|                  |                     |                        | 6              | P15.7            | input to select fuel 2/oil               |
|                  |                     |                        | 35             | *panel 120V*     | to remote reset normally open pushbutton |
|                  |                     |                        | 38             | P15.2            | to remote reset normally open pushbutton |
| 3                |                     |                        | 7              | P4.2             | line output to alarm (lockout)           |
| 5                | BM                  |                        |                | P4.4             | line output to blower motor              |
| 8                | PV1                 |                        |                | P5.7             | line output to ignition/pilot valve      |
| 9                | MF                  |                        |                | P5.5             | line output to main valve                |
|                  |                     |                        | 39             | P11.10           | external load controller 4-20mA (+)      |
|                  |                     |                        | 40             | P11.11           | external load controller 4-20mA (-)      |
|                  |                     | harness pin 1          |                | P5.7             | light panel "IGNITION ON"                |
|                  |                     | harness pin 2          |                | P4.2             | light panel "FSG ALARM"                  |
|                  |                     | harness pin 4          |                | P5.5             | light panel "MAIN FUEL"                  |
|                  |                     | harness pin 5          |                | P4.4             | light panel "DEMAND"                     |
|                  |                     | harness pin 8          |                | *panel neutral*  | light panel neutral                      |

**NOTES:**

This conversion is designed to allow the Q7800C PCB to be completely removed.

Combustion air switch is in the safety loop. Other limits may be in the operating or safety loop depending upon field wiring.

Program digital input 1 for burner control function with AND action.

Program digital input 14 for remote reset function (if needed).

Connect NXF4000 terminals P4.1 and P4.3 to line 120V.

Ignition and pilot valve are connected to same terminal so ensure that PTFI settings for burner control are the same (i.e. 10/10).

Use profile name GAS for all profiles -- switching of P5.5 is handled using Gas/Oil change switch.

Auto/manual is handled using the NXD410TS user interface.

It is recommended that a temperature or pressure sensor is used instead of the external load controller.

