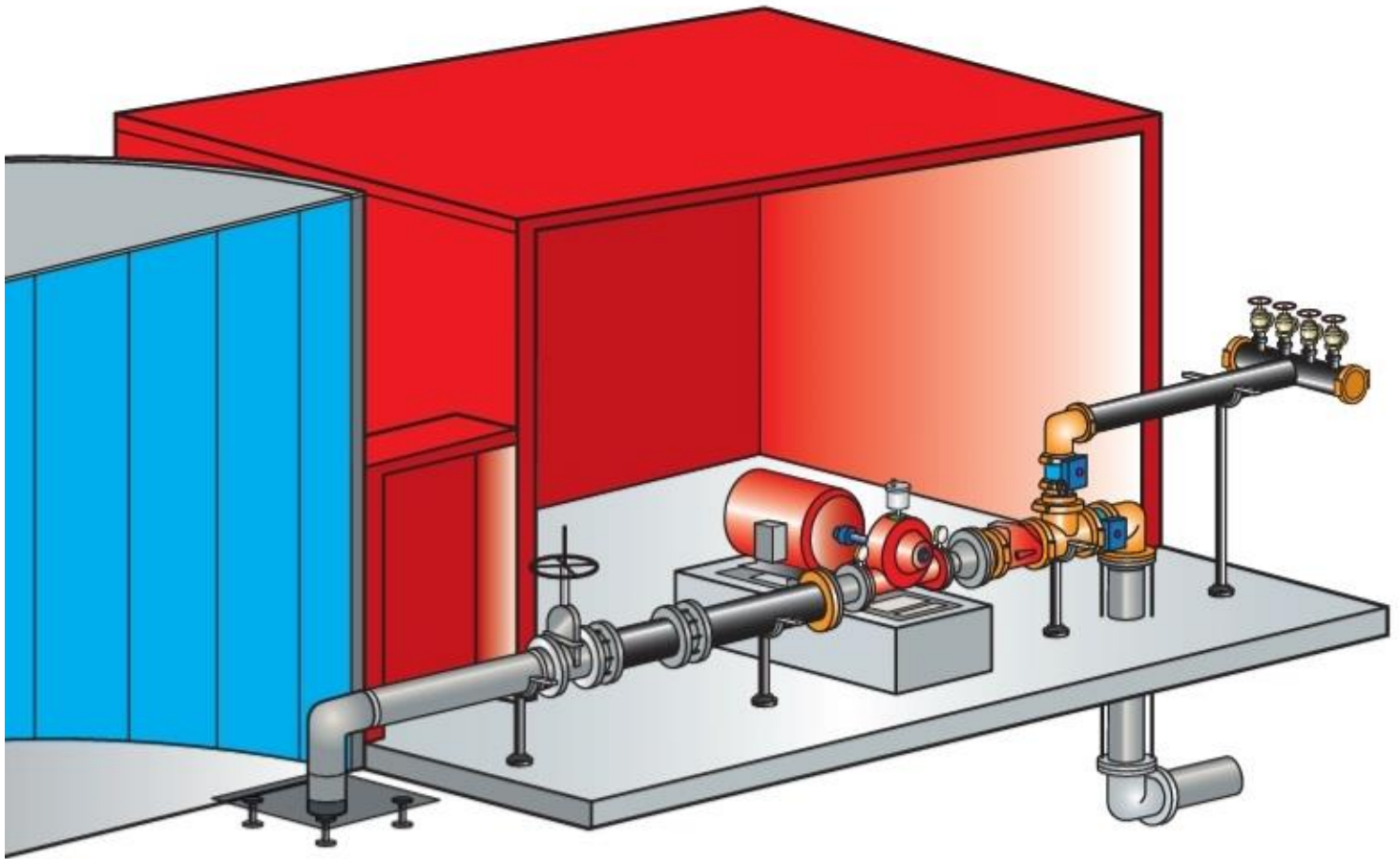


Fire Pump Room Testing and Commissioning



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Fire pump Room Testing And Commissioning

Commissioning

Before Making the start Up and testing For the Pump set we shall revise and check all Mechanical and Electrical installation works as below :

1. Diesel Driven Pump

- Check Water Tanks isolation valves
- Check the installation of the Anti Vortex -plates As per NFPA 22 And NFPA 20
- Check the Isolation valves on the suction line
- Check the installation of the Stainless steel Flexible connection on the suction line
- Check the Pump suction connection with the Pipes and the Concentric Reducer Direction
- Check the Installation of Pipe supports on the both Suction and Discharge Lines
- Check the installation of the Pressure gauges on the Both pump suction and discharge as per NFPA 20 and Supplier recommendations
- Check the installation of the pump and the Anchoring with the concrete base As per supplier recommendation
- Check filling the Pump steel base with Concrete as per supplier recommendation
- Check the shaft Cooling pipes connections with the Pump Body as per Pumps data sheet
- Check the engine Cooling pipes connections as per Pumps data sheet and manual instructions
- Check the Installation of the Relief valve and connections with discharge pipes
- Check the installation of the Waste cone
- Check the installation with the Sight glass for the waste cone
- Check the installation of Check valve on the discharge line as per NFPA 20
- Check the installation of the Isolation valves on the discharge line as per NFPA 20
- Check the installation of the sensing line and distance between isolation and check valves as per as per NFPA 20
- Check The Muffler and Exhaust flexible connection installation Direction as per supplier Recommendation

- Check the Control panel installation and connection between Diesel Engine Manual panel and control panel as per Supplier Recommendation
- Check the Installation of the Diesel Fuel tank and all tank Accessories as per Pumps datasheet
- Check installation of the Fuel pipes and Valves Asper pumps data sheet
- Check installation of Pump Automatic air release as per Pumps data sheet
- Check installation of diesel batteries , Racks and Cables as per Pumps data sheet

TORNATECH MODEL GPD DIESEL FIRE PUMP CONTROLLER PRE- FIELD ACCEPTANCE TEST CHECK LIST			
Note: This document should be an official indication of whether or not the installation and general condition of the equipment is adequate for a field acceptance test. This document should also aid the individual responsible for executing the field acceptance test to decide whether or not to carry out the field acceptance test of the equipment.			
Installation Check List:		YES	NO
1	Verify that the nameplate voltages of the Fire Pump Controller corresponds with the AC voltage available and the DC starting voltage of the engine.		
2	Visual inspection for any damage to the exterior of the Fire Pump Controller. Make sure the enclosure, alarm bell, selector switch, membrane and display are not damaged.		
3	Verify that the Fire Pump Controller has been installed within sight of the pump and engine or motor.		
4	Verify that the Fire Pump Controller has been installed not less than 12 inches from the floor of the mechanical room.		
5	Verify that all electrical connections to the Fire Pump Controller are done using liquid tight conduit and connectors.		
6	With the Fire Pump Controller door open, visually inspect for any drill chips, dirt or foreign objects in the bottom of the enclosure, loose wires, broken components and general proper electrician workmanship.		
7	Verify that the correct AC voltage is supplied to the controller by taking a voltage reading at the L1 & N (120V) or L1 & L2 (220-240) terminals.		
8	Verify that the terminal connections between the Fire Pump Controller and the engine (1 to 12 and 301,302,303,304,305,310,311,312) are properly done.		
9	Verify that wiring to terminals #6, #8 (batteries) and #11 (ground) are of the appropriate gauge size. See label inside controller.		
10	Verify proper grounding of the Fire Pump Controller.		
Initial Power-Up Check List:		YES	NO
1	Verify that the selector switch is in the "OFF" position		
2	With the Fire Pump Controller door open, turn to "ON" the circuit breakers CB3 and CB4 (DC) then CB1 and CB2 (AC), then IS1. This sequence is very important.		
3	Close the Fire Pump Controller door. Verify on the ViZiTouch Homepage that the correct battery voltage appears.		
4	Place the selector switch in the "HAND" position. Verify that no alarms are displayed on the screen.		

5	Place the selector switch in the "AUTO" position. Verify that no alarms are displayed on the screen.		
Manual and Automatic Start Check List:		YES	NO
1	Place the selector switch in the "Hand" position.		
2	Verify the starting of the engine by pressing the "Battery # 1 Manual Crank" membrane button.		
3	Stop the engine by placing the selector switch to the "OFF" position.		
4	Verify the starting of the engine by pressing the "Battery # 2 Manual Crank" membrane button.		
5	Stop the engine by placing the selector switch to the "OFF" position.		
6	Set the Cut-Out and Cut-In settings by following the ViZiTouch documentation. You need to be logged in to modify these settings. Verify the automatic start by dropping the system pressure below the Cut-In setting.		
7	Stop the engine by pressing the "Stop" pushbutton. Note: The engine will only stop if the system pressure is above the Cut-Out setting.		

Tornatech Controller S/N: _____

Installation address: _____

Check list completed? _____ Yes _____ No

Check list completed by: _____

Company: _____

Date: _____

Witnessed By: _____

Comments:

**TORNATECH MODEL GPD
DIESEL ENGINE FIRE PUMP CONTROLLER
FIELD ACCEPTANCE TEST REPORT**

Note: This document is the Tornatech official Field Acceptance Test report which follows the latest NFPA 20 requirements of article 14.2.6 Controller Acceptance Test pertinent to diesel engine driven fire pump controllers. Tornatech strongly recommends that a pre-field acceptance verification (Tornatech document GPD-PREFAT-001-E Pre-Field Acceptance Test Check List) be completed before this official field acceptance test.

Complete this first section if it was not completed during the Pre-Field Acceptance test

Manual and Automatic Start Check List:		YES	NO
1	Place the selector switch in the "Hand" position.		
2	Verify the starting of the engine by pressing the "Battery # 1 Manual Crank" membrane button.		
3	Stop the engine by placing the selector switch to the "OFF" position.		
4	Verify the starting of the engine by pressing the "Battery # 2 Manual Crank" membrane button.		
5	Stop the engine by placing the selector switch to the "OFF" position.		
6	Set the Cut-Out and Cut-In settings by following the ViZiTouch documentation. You need to be logged in to modify these settings. Verify the automatic start by dropping the system pressure below the Cut-In setting.		
7	Stop the engine by pressing the "Stop" pushbutton. Note: The engine will only stop if the system pressure is above the Cut-Out setting.		
Battery # 1		YES	NO
1	3 manual starts		
2	3 automatic starts		
3	1 RUN TEST start		
4	1 remote/deluge valve start		
5	Start and Run the engine at full speed after 1 crank cycle		
Battery # 2		YES	NO
1	3 manual starts		
2	3 automatic starts		
3	1 RUN TEST start		
4	1 remote/deluge valve start		
5	Start and Run the engine at full speed after 1 crank cycle		
Visual/Audible Alarm Verification		YES	NO

1	Battery failure: - On the terminal strip, disconnect wire #6 for battery1. Wait for the alarm, then reconnect the wire. - On the terminal strip, disconnect wire #8 for battery2. Wait for the alarm, then reconnect the wire. - Audible and visual alarm will appear for battery failure and controller trouble. Note: it is important to return the wires back to their original place and reset the alarms in order to continue the tests.		
2	Charger failure: - Switch either circuit breaker #1 (CB1) or circuit breaker #2 (CB2) to the OFF position to test either charger. - Audible and visual alarm will appear for charger failure and controller trouble Warning: Do not switch both CB1 and CB2 off at the same time. Note: it is important to return the circuit breaker back to its original position and reset the alarms in order to continue the tests.		
3	Engine high coolant temperature: - Start the engine either manually or automatically. - With the engine running, place a jumper between terminals 5 & 11 or simulate high coolant signal coming from the engine. - If the engine was started manually, a visual and audible alarm will be present and the engine will not shutdown. To shutdown, turn the selector switch to the OFF position.		
	- If the engine was started automatically, a visual and audible alarm will be present and the engine will not shutdown. To shutdown, turn the selector switch to the OFF position. - Note: Please remove the jumpers and reset the alarm in order to continue to the next simulation.		
4	Engine low oil pressure: - Start the engine either manually or automatically. - With the engine running, place a jumper between terminals 4 & 11 or simulate engine low oil pressure from the engine. The alarm will annunciate after 8 seconds. - If the engine was started manually, a visual and audible alarm will be present and the engine will not shutdown. To shutdown, turn the selector switch to the OFF position. - If the engine was started automatically, a visual and audible alarm will be present and the engine will not shutdown. To shutdown, turn the selector switch to the OFF position. Note: Please remove the jumpers and reset the alarm in order to continue to next simulation.		
5	Engine Overspeed: - Start the engine either manually or automatically. - With the engine running, place a jumper between terminals 6 & 3 or simulate overspeed from the engine. - An audible and visual alarm will be present and the engine will shutdown whether it was started manually or automatically. Note: Please remove jumpers and reset the alarm in order to continue to next simulation. Note: The speed switch must be reset on the engine itself.		

6	Engine fail to start: - At the terminal strip, disconnect wires #9 and #10 - Place the controller selector switch to Auto and initiate automatic engine start or start engine by pressing the Run Test Button The controller will go through its cranking cycle as follows: - 15 second cranking from battery #1 - 15 second rest - 15 second cranking from battery #2 - 15 second rest - This cycle will repeat itself three times per battery, hence six times. - Audible and visual alarm for engine fail to start will appear. - Switch the engine control panel back to OFF position and reset the alarm.		
7	Stop the engine by pressing the "Stop" pushbutton. Note: The engine will only stop if the system pressure is above the Cut-Out setting.		

Field Settings:

Cut-Out Pressure: _____

Cut-In Pressure: _____

Minimum run period timer activated?

Yes: _____ Set at _____ minutes. No: _____

Sequential Start Timer?

Yes: _____ Set at _____ seconds. No: _____

Weekly Test Enabled?

Yes: _____ Start (date and time) _____ No: _____

Stop (date and time) _____

Alarm Contacts Connections:

SUMMARY

Selector switch in OFF or HAND connected? ____ Yes ____ No

Engine Run connected? ____ Yes ____ No

Engine Trouble connected? ____ Yes ____ No

Controller Trouble connected? ____ Yes ____ No

Other contacts supplied and connected?

Yes: _____ No: _____

Tornatech Controller S/N: _____

Installation address: _____

Field Acceptance Test completed? ____ Yes ____ No

Field Acceptance completed by: _____

Company: _____

Date: _____

Witnessed By: _____

Company: _____

The undersigned witness has been made aware of the NFPA20 article 14.4 Periodic Inspection, Testing and Maintenance which stipulates that "Fire pumps shall be inspected tested and maintained in accordance with NFPA25 – Standard for the Inspection, Testing and Maintenance of Water Based Fire Protection Systems"

Comments: _____

2. Electric Driven Pump

- Check Water Tanks isolation valves
- Check the installation of the Anti Vortex -plates As per NFPA 22 And NFPA 20
- Check the Isolation valves on the suction line
- Check the installation of the Stainless steel Flexible connection on the suction line
- Check the Pump suction connection with the pipes
- Check the Installation of Pipe supports on the both Suction and Discharge Lines
- Check the installation of the Pressure gauges on the Both pump suction and discharge as per NFPA 20 and Supplier recommendations
- Check the installation of the pump and the Anchoring with the concrete base As per supplier recommendation
- Check filling the Pump steel base with Concrete as per supplier recommendation
- Check the shaft Cooling pipes connections with the Pump Body as per Pumps data sheet
- Check the Installation of the Casing Relief valve to the waste drain
- Check the installation of Check valve on the discharge line as per NFPA 20
- Check the installation of the Isolation valves on the discharge line as per NFPA 20
- Check the installation of the sensing line and distance between isolation and check valves as per as per NFPA 20
- Check the Control panel installation
- Check the Electric power connections with pump Engine
- Check installation of Pump Automatic air release as per Pumps data sheet

Pre-Field Acceptance Test		
TORNATECH MODEL GPX WITH OR WITHOUT GPU TRANSFER SWITCH ELECTRIC FIRE PUMP CONTROLLER PRE- FIELD ACCEPTANCE TEST CHECK LIST		
Note: This document should be an official indication of whether or not the installation and general condition of the equipment is adequate for a field acceptance test. This document should also aid the individual responsible for executing the field acceptance test to decide whether or not to carry out the field acceptance test of the equipment.		
Installation Check List:		
YES	NO	
1	Verify that the nameplate of the Fire Pump Controller corresponds with the AC voltage available.	

2	Visual inspection for any damage to the exterior of the Fire Pump Controller. Make sure the enclosure, alarm bell, selector switch, membrane and display are not damaged.		
3	Verify that the Fire Pump Controller has been installed within sight of the pump and engine or motor.		
4	Verify that the Fire Pump Controller has been installed not less than 12 inches from the floor of the mechanical room.		
5	Verify that all electrical connections to the Fire Pump Controller are done using liquid tight conduit and connectors.		
6	With the Fire Pump Controller door open, visually inspect for any drill chips, dirt or foreign objects in the bottom of the enclosure, loose wires, broken components and general proper electrician workmanship.		
7	Verify that the correct Normal Power AC voltage is supplied to the controller by taking a voltage reading at the incoming terminals of the isolating switch (IS).		
8	Verify that the motor leads are connected for the corresponding starting method.		
Initial Power-Up Check List:		YES	NO
1	Controller door must be closed and latched with Normal Power Disconnecting Means handle in the OFF position. If a Transfer Switch is supplied, its door must be closed and latched with the Alternate Power Isolating Switch handle in the OFF position.		
2	Verify that the Emergency Start Handle is in the OFF position.		
3	Place the Disconnecting Means handle in the ON position.		
4	Verify that the Normal Power voltage and hertz displayed on the digital screen are the same as measured in point 7 of the Installation Checklist above.		
5	Verify that there is no Phase Reversal Alarm.		
Note: A manual or automatic start must only be executed if the motor and the pump have been cleared to be started by their respective official service technicians.		YES	NO
1	Place the Disconnecting Means handle in the ON position.		
2	Push the START pushbutton. The motor will start.		
3	Verify the motor rotation: • If the motor rotation is correct, no adjustment is required. • To correct the motor rotation, change motor connection leads 1 and 3 (A and C) at the run contactor		
4	Verify any alarms that would appear on the digital display screen. Correct any alarm condition.		
5	Set the Cut-Out and Cut-In settings by following the ViZiTouch documentation. You need to be logged in to modify these settings. Verify the automatic start by dropping the system pressure below the Cut-In setting.		
6	Stop the motor by pressing the "STOP" membrane button. Note: the motor will only stop if the system pressure is above the cut-out setting.		

Tornatech Controller S/N: _____

Installation address: _____

Check list completed? _____ Yes _____ No

Check list completed by: _____

Company: _____

Date: _____

Witnessed By: _____

Comments: _____

SUMMARY

Field Acceptance Test Report			
TORNATECH MODEL GPX WITH OR WITHOUT GPU TRANSFER SWITCH ELECTRIC FIRE PUMP CONTROLLER FIELD ACCEPTANCE TEST REPORT			
Complete this first section if it was not completed during the Pre-Field Acceptance test			
Note: A manual or automatic start must only be executed if the motor and the pump have been cleared to be started by their respective official service technicians.		YES	NO
1	Place the Disconnecting Means handle in the ON position.		
2	Push the START pushbutton. The motor will start.		
3	Verify the motor rotation: - If the motor rotation is correct, no adjustment is required. - To correct the motor rotation, change motor connection leads 1 and 3 (A and C) at the run contactor		
4	Verify any alarms that would appear on the digital display screen. Correct any alarm condition.		
5	Set the Cut-Out and Cut-In settings by following the ViZiTouch documentation. You need to be logged in to modify these settings. Verify the automatic start by dropping the system pressure below the Cut-In setting.		
6	Stop the motor by pressing the "STOP" membrane button. Note: the motor will only stop if the system pressure is above the cut-out setting.		
Phase Reversal Verification		YES	NO
1	Verify or simulate phase reversal Overcurrent Protection Controller nameplate info Electric Motor nameplate info FLC: _____ A FLC: _____ A LRC: _____ A LRC: _____ A		
Motor Starts			
Normal Power		YES	NO
1	6 manual starts		
2	6 automatic starts		
3	6 Emergency Handle starts		
4	1 remote/deluge valve start		

Field Settings:		
Cut-Out Pressure: _____		
Cut-In Pressure: _____		
Minimum run period timer activated?		
Yes: _____	Set at _____ minutes.	No: _____
Sequential Start Timer?		
Yes: _____	Set at _____ seconds.	No: _____
Weekly Test Enabled?		
Yes: _____	Start (date and time) _____	No: _____
	Stop (date and time) _____	

Alarm Contacts Connections:		
Fire Pump Controller		
Motor Run connected?	_____ Yes	_____ No
Power Available connected?	_____ Yes	_____ No
Phase Reversal connected?	_____ Yes	_____ No
Other contacts supplied and connected?	_____ Yes	_____ No

SUMMARY

Tornatech Controller S/N: _____

Installation address: _____

Field Acceptance Test completed? ____ Yes ____ No

Field Acceptance completed by: _____

Company: _____

Date: _____

Witnessed By: _____

Company: _____

The undersigned witness has been made aware of the NFPA20 article 14.4 Periodic Inspection, Testing and Maintenance which stipulates that "Fire pumps shall be inspected tested and maintained in accordance with NFPA25 – Standard for the Inspection, Testing and Maintenance of Water Based Fire Protection Systems"

Comments: _____

SUMMARY

3. Jockey pump

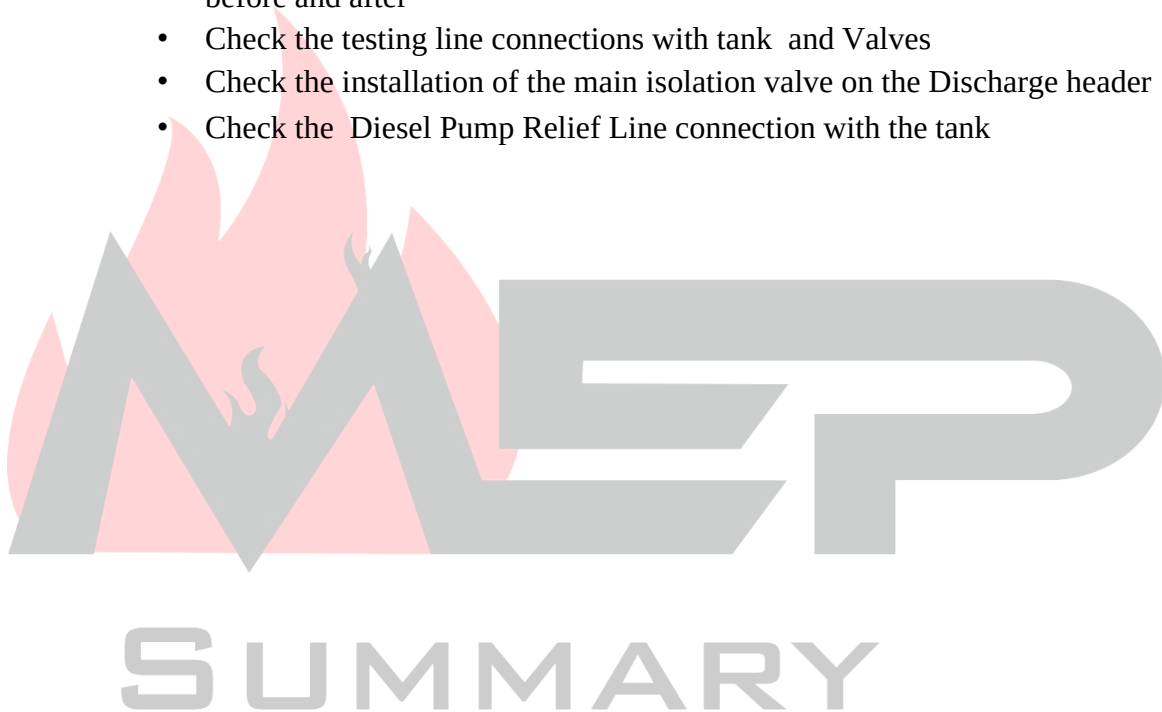
- Check the Isolation valves on the suction line
- Check the installation of the Stainless steel Flexible connection on the suction line
- Check the Pump suction connection with the Pipes
- Check the Installation of Pipe supports on the both Suction and Discharge Lines
- Check the installation of the pump and the Anchoring with the concrete base
- Check the installation of Check valve on the discharge line as per NFPA 20
- Check the installation of the Isolation valves on the discharge line as per NFPA 20
- Check the installation of the sensing line and distance between isolation and check valves as per as per NFPA 20
- Check the Control panel installation
- Check the Electric power connections with pump Engine

VISUAL INSPECTION	YES	NO
Inspect cleanliness of controller.		
Remove any object from the top of controller.		
Dust and clean the controller.		
Inspect controller for any evidence of corrosion outside.		
Inspect controller for any evidence of corrosion inside.		
Check for leaks on pressure transducer and piping.		
Inspect door for proper alignment and function of door locks		
Inspect tightness of all connections		
Inspect tightness of all terminal jumpers		
Inspect controller grounding		
Inspect relays, contactors, and timers for any evidence of damage.		
Inspect motor contactor power contacts.		
Inspect tightness of all mounting nuts and screws.		

OPERATIONAL INSPECTION	YES	NO
Check motor rotation.		
Start from water pressure control.		

4. General

- Check the installation of the Water Flow meter and required distance before and after
- Check the testing line connections with tank and Valves
- Check the installation of the main isolation valve on the Discharge header
- Check the Diesel Pump Relief Line connection with the tank



Start Up and Testing

After Commissioning and revision for all mechanical , electrical Works and Pump set installation we are sure that all parts are installed Correctly now we will make the start up and testing the Pumps as per attached NFPA 20 snap shot as following :

1. Diesel Driven Pump

- Make sure the tank is Filled with water

- Make sure the valves on the suction header and Suction line are Fully Opened
- Make sure the Valves and Flanged connection is fully tighten and there is no leakage
- Make sure the Batteries are charged
- Make sure that the Diesel tank is full and the valves on return and supply is fully opened
- Make Sure the control Panel is online
- Make sure the pressure Gauges valves is opened
- Make sure the valves on the Engine cooling pipes are opened
- Prepare the Relief valve to be Adjusted before starting up , the Adjusting to be at the Churn pressure as per manufacture recommendation
- Program the control panel on the required pressure As per NFPA 20
- Now the Pump is ready for Starting Up
- After starting up Make the relief valve adjusting and keep watching the Cooling water temperature and Pump body temperature
- Now make the test basically at three point , at zero flow , at 150 % of the pump flow, at 65 % and any needed points
- Now draw the pump Curve by the Obtained data (Head , flow) and compare it with the Pump cure mentioned in the data sheet

2. Electric Driven Pump

- Make sure the tank is Filled with water
- Make sure the valves on the suction header and Suction line are Fully Opened
- Make sure the Valves and Flanged connection is fully tighten and there is no leakage
- Make Sure the control Panel is online
- Make sure the pressure Gauges valves is opened
- Prepare the Casing Relief valve to be Adjusted before starting up , the Adjusting to be at the Churn pressure as per manufacture recommendation
- Program the control panel on the required pressure As per NFPA 20
- Now the Pump is ready for Starting Up
- After starting up Make the Casing relief valve adjusting and keep watching the Pump body temperature
- Now make the test basically at three point , at zero flow , at 150 % of the pump flow, at 65 % and any needed points
- Now draw the pump Curve by the Obtained data (Head , flow) and compare it with the Pump cure mentioned in the data sheet

3. Jockey Pump

- Make sure the tank is Filled with water
- Make sure the valves on the suction header and Suction line are Fully Opened
- Make sure the Valves and Flanged connection is fully tighten and there is no leakage
- Make Sure the control Panel is online
- Make sure the pressure Gauges valves is opened
- Program the control panel on the required pressure As per NFPA 20
- Now the Pump is ready for Starting Up

