

INFORMATIVE

SCI - FIRE FIGHTING SYSTEM

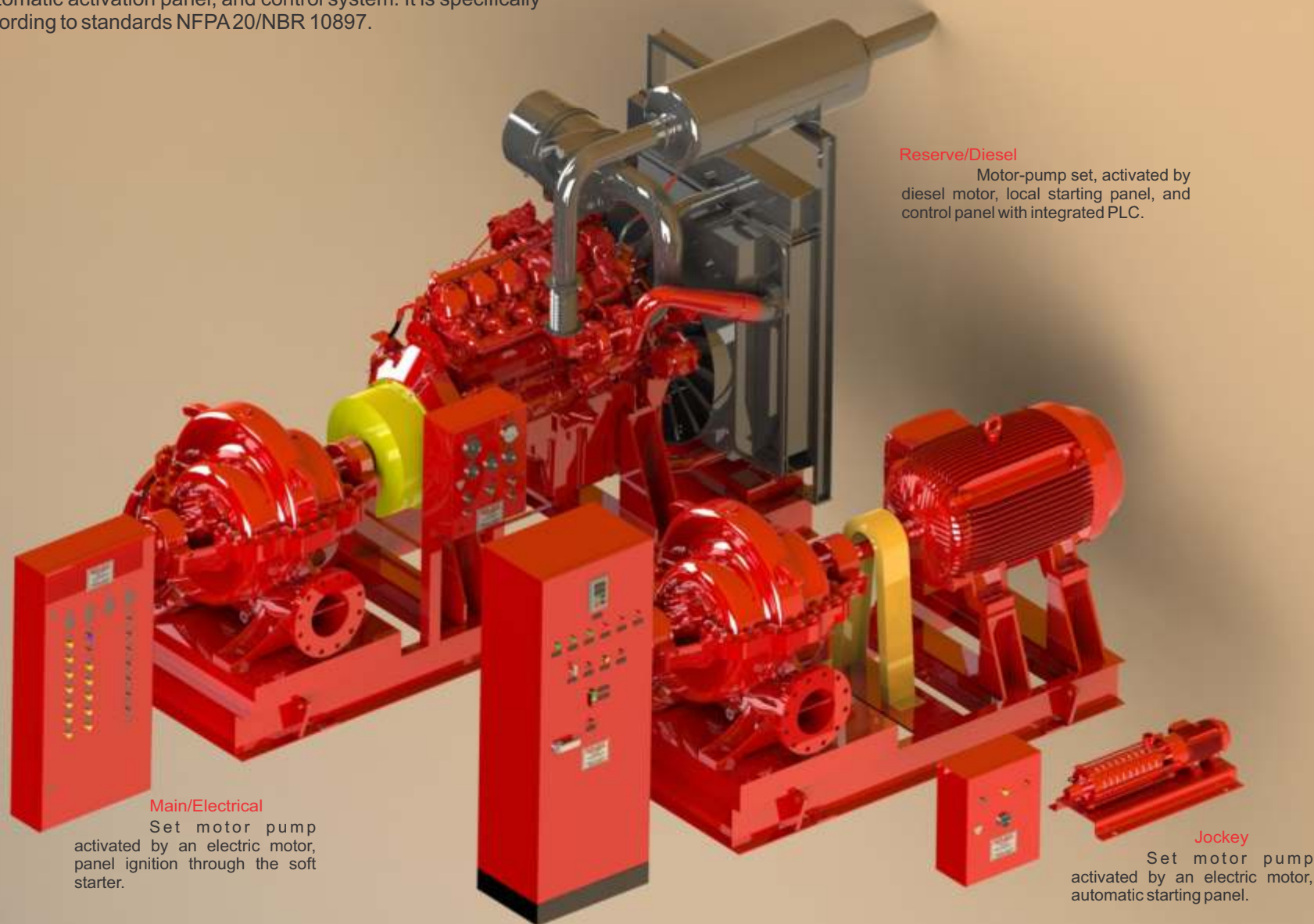


Intended for customers, distributors and partners

Introduction

This system is responsible for supplying water to the complex of hydrants/sprinklers in order to battle fires. This system includes motor-pump set, automatic activation panel, and control system. It is specifically designed according to standards NFPA 20/NBR 10897.

INNOVATING TO ACHIEVE EXCELLENCY



Logical Operation

The SCI - Fire Fighting System, is designed to control and battle possible risks through a motor-pump set, which is exclusively installed to feed the hydrants/sprinklers complex. This system must be operated by properly trained staff, usually called **Brigade** or **Fire Department**.

The system has automatic operation, which starts when the first hydrant is opened. Below are the descriptions of the pumps and their respective designations:

➤ **Jockey Pump** is a closed coupled set activated by electric motor. It is responsible for continuous line pressurization and operates in automatic mode. It avoids small leaks and expansion of the line that could lead to failure of the operation line; therefore the combat and control are immediate.

➤ **Main Pump** - Electric set responsible for supplying water to the hydrants and/or sprinklers. It operates in automatic mode and the shutdown is only possible by manually pushing down a key which is properly installed in the control panel.

➤ **Reserve Pump** - A diesel set responsible for supplying water to the hydrants and/or sprinklers in case the electrical power is interrupted, or there is a failure with the main pump. This set is equipped with an automatic activation system, and shutdown is done manually through pushbutton properly installed in the panel control.

Example:

In a network with nominal pressure 10kgf/cm², there is a barrel (see photo p.3) installed with 03 pressostat pressure switches, which are configured as follows: P1 - Jockey (9kgf/cm²)/ P2 - Main/Electrical (7kgf/cm²)/ P3 - Reserve/Diesel (5kgf/cm²).

These switches are responsible for sending the pump activation signal automatically. If there is a leak in the line due to low pressure, within the range of P1, the Jockey pump will be activated to stabilize the nominal pressure of the line. This feature will also discontinue operation automatically (only pump in this system containing this type of configuration). In case of a problem after the network of hydrants and the network of sprinklers has been activated, the line pressure will drop reaching the established pressure in P2, then the pressostat pressure switch will generate an activation signal for the Main/Electrical pump.

During firefighting, if there is a problem in the electrical system or power failure that causes the interruption of the Main pump, then the line may fall again and reach the pressure established in P3. This moment the pressostat pressure switch generates an activation signal to the Reserve/Diesel pump. This set has the same working point of the first pump (Jockey) which will restore the system's ability to continue firefighting. The reservoir for the operation of this system must be **EXCLUSIVE**, according to the relevant standards of Fire Departments in each state.

After the fire is controlled, the electrical and diesel pump systems (not jockey) should be turned off manually by trained personnel.

The SCI should be properly installed in a covered pump house, preferably in masonry, therefore protecting it from any kind of wear condition over time. The system must be tested for a period of 15 to 30 minutes each week, thus being able to promptly meet any need of emergency.

INFORMATIVE

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Applied Technology

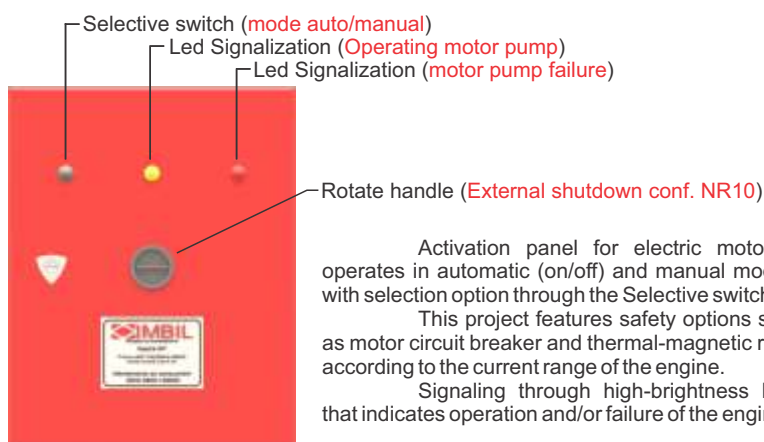
The SCI systems count with the latest technology available. All logical operation is based on safety standards and operation approved by the competent departments.

The electric panels are manufactured with starting switches **Soft-Starter** Models, therefore enabling the starting peak of the motor pump set.

The control panels includes intelligent battery chargers **CLP**, LED signalization lights, and indication through ammeter and voltmeter to control battery bank. The **CLP** is responsible for managing the system. It coordinates the entire sequence of initialization, alarms and information available to the user. It also features remote activation signal and alarm.

The local activation panel features specific controller for diesel engines, which are responsible for coordinating the acceleration during the labor period. It also performs calculations to maintain the RPM programmed regardless of the operating point of the pump.

This system has a robust design suitable for industrial applications.

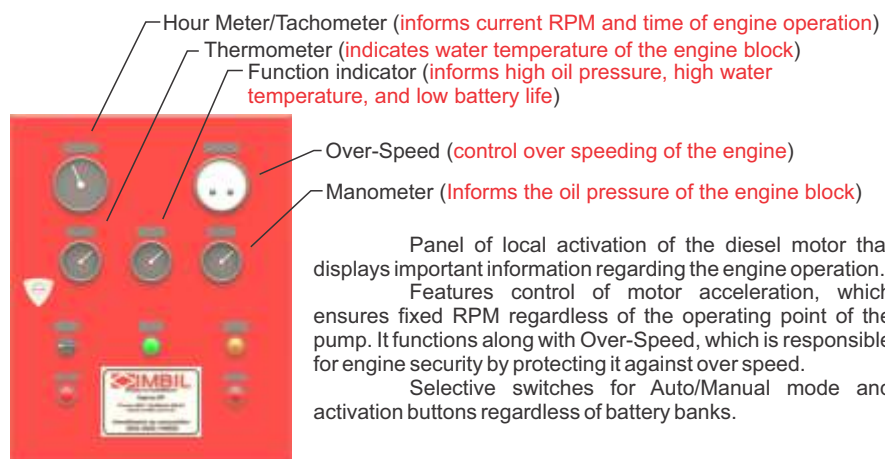


Jockey Panel
220/380/440 Vac***
***other tensions available
after consultation

Activation panel for electric motor. It operates in automatic (on/off) and manual modes, with selection option through the Selective switch.

This project features safety options such as motor circuit breaker and thermal-magnetic relay according to the current range of the engine.

Signaling through high-brightness LED that indicates operation and/or failure of the engine.

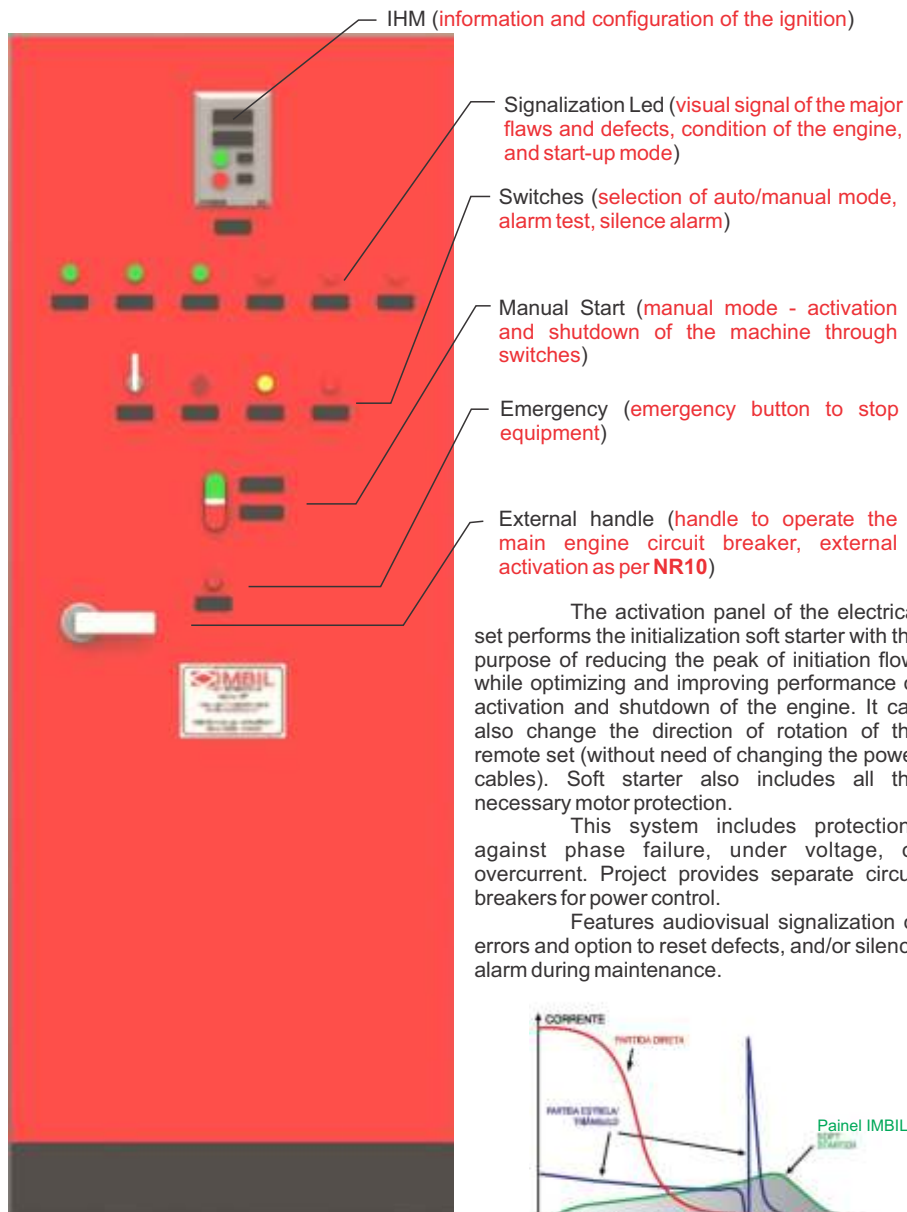


Local Diesel Panel
12/24 Vcc

Panel of local activation of the diesel motor that displays important information regarding the engine operation.

Features control of motor acceleration, which ensures fixed RPM regardless of the operating point of the pump. It functions along with Over-Speed, which is responsible for engine security by protecting it against over speed.

Selective switches for Auto/Manual mode and activation buttons regardless of battery banks.

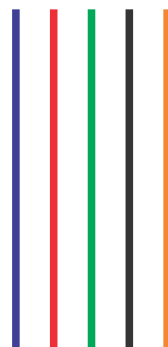
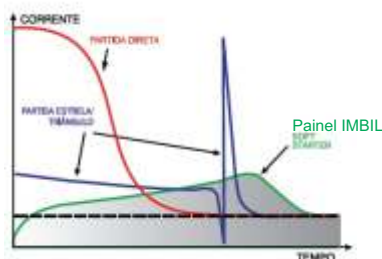


Jockey Panel 220/380/440 Vac***
(***other tensions available after consultation)

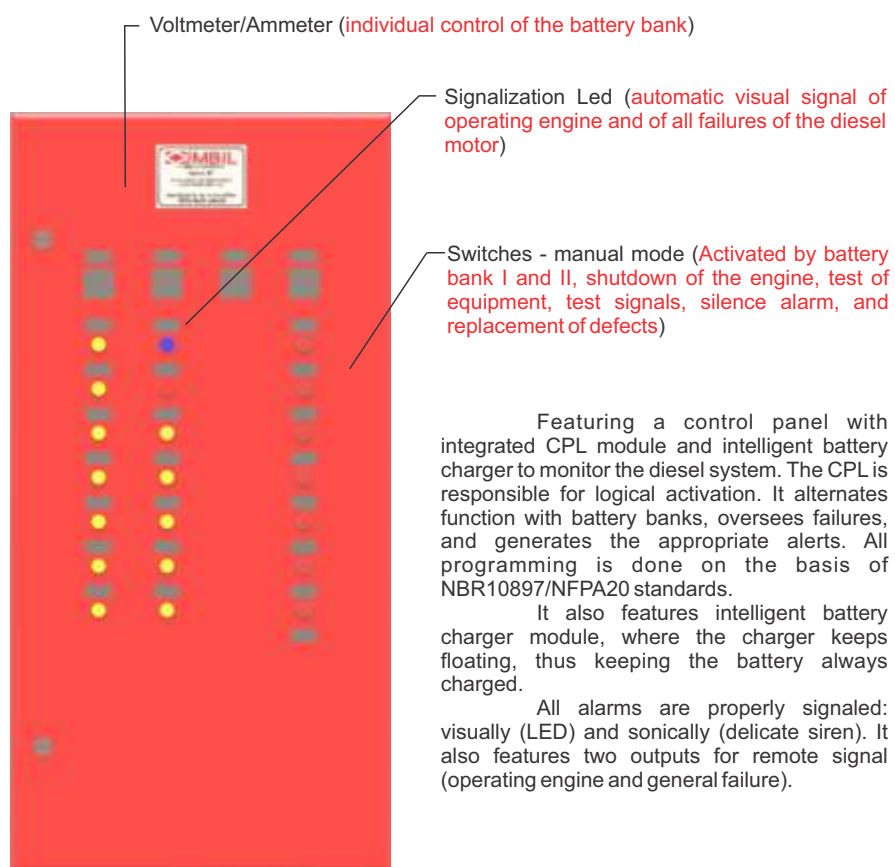
The activation panel of the electrical set performs the initialization soft starter with the purpose of reducing the peak of initiation flow, while optimizing and improving performance of activation and shutdown of the engine. It can also change the direction of rotation of the remote set (without need of changing the power cables). Soft starter also includes all the necessary motor protection.

This system includes protections against phase failure, under voltage, or overcurrent. Project provides separate circuit breakers for power control.

Features audiovisual signalization of errors and option to reset defects, and/or silence alarm during maintenance.



Note: Interconnection between the local panel and switchboard, responsible for the control and activation of the Diesel system (more information is available in the manuals and electric diagrams supplied with the equipment).



Command Diesel Panel
12 24 Vcc

Featuring a control panel with integrated CPL module and intelligent battery charger to monitor the diesel system. The CPL is responsible for logical activation. It alternates function with battery banks, oversees failures, and generates the appropriate alerts. All programming is done on the basis of NBR10897/NFPA20 standards.

It also features intelligent battery charger module, where the charger keeps floating, thus keeping the battery always charged.

All alarms are properly signaled: visually (LED) and sonically (delicate siren). It also features two outputs for remote signal (operating engine and general failure).

Pump activation can be done through monitoring using digital signal that are available on the terminal strip panels.

INFORMATIVE

SCI - FIRE FIGHTING SYSTEM



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Standard NFPA20

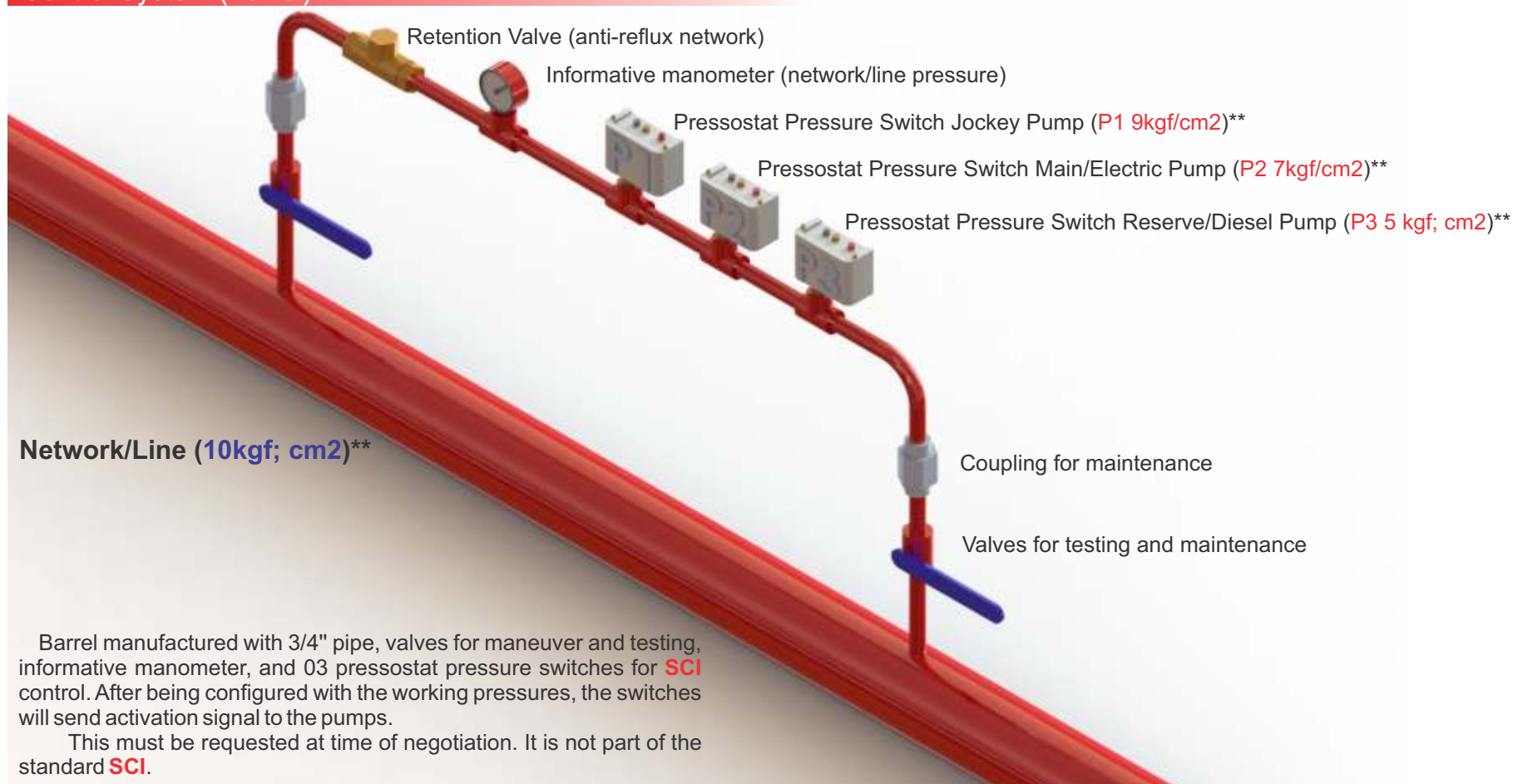
According to the standard, SCI must follow some regulations, such as:

- Pumps should be used only for the purpose of firefighting.
- The automation of pump must be established so that after initiation, shutdown can only be done manually.
- Pumps should reach their full work potential in 30 seconds.
- Maximum pressure at the hose outlet - 10kgf/cm² (100m).
- The water reach should be of at least 8 meters from the outlet of the hose.
- The pump flow rate should reach 150% of the expected flow (operating point).
- The pump pressure cannot be less than 65% of the designed pressure.
- The engine power must be able to cover the entire curve of the pump.
- The difference of pressure between the pressostat pressure switch must be of at least 1kgf/cm² (10m).
- Pumps with combustion engine must be able to operate at full load for 6 hours straight.
- The fuel tank should provide at least 2x the operating time of 6 hours.
- In the case where there is only one fire pump actuated by the combustion engine, the activation must always be set to automatic mode.

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SCI systems can be supplied for any flow rate and pressure. Data must be provided via **sales check-list**.

Control System (Barrel)



**Valores teóricos, necessário cálculo específico para projeto.

Factory Tests

All **SCI** are assembled and tested at our factory where its logical operation is verified, and compliance to all relevant standards (**NBR10897** and **NFPA20**) are confirmed. During the assembly the systems receive seals for each approved point of the process. To finalize the process continuity and functional tests are performed to ensure full functionality of the systems provided.



“ Sistema de Gestão da Qualidade certificado conforme a Norma ISO 9001:2008 ”

Start-up

We recommend 02 days of start-up to certify that all **SCI** components involved are perfectly functioning. The visits are usually divided into two stages:

1st Visit - Check the installation, supply and instrumentation of the pump house (check-list of corrections available for the customer).

2nd Visit - Start-up of the system and functional tests (100% verification of the necessary corrections cited in the first visit).

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SCI - FIRE FIGHTING SYSTEM



Soluções em Bombeamento

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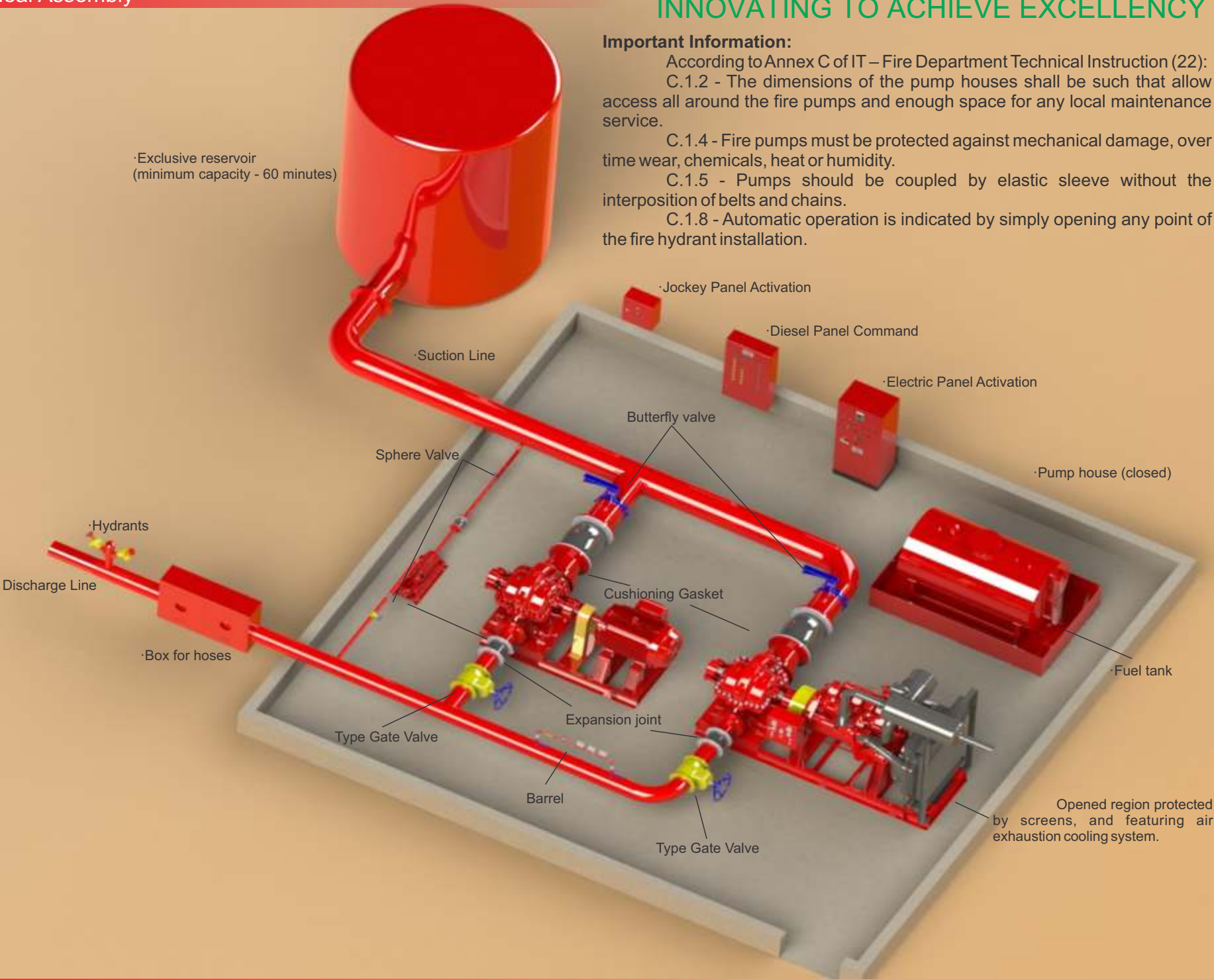
Important Information:

According to Annex C of IT – Fire Department Technical Instruction (22):
C.1.2 - The dimensions of the pump houses shall be such that allow access all around the fire pumps and enough space for any local maintenance service.

C.1.4 - Fire pumps must be protected against mechanical damage, over time wear, chemicals, heat or humidity.

C.1.5 - Pumps should be coupled by elastic sleeve without the interposition of belts and chains.

C.1.8 - Automatic operation is indicated by simply opening any point of the fire hydrant installation.



Proper Placement/Periodic Maintenance

IMBIL recommends the following precautions during placement:

- Keep in a closed area protected against water and dust;
- Take care to avoid moisture/humidity in electronic equipment;
- Do not remove the protections of the suction and discharge nozzles;
- Remove the gaskets to prevent corrosion of the plugs (> 30 days);
- Use oil to lubricate the bearings and the pump (> 30 days);
- Manually rotate shafts every week so that all moving parts are lubricated;
- Check retightening of screws and connections of motor-pump set and panels provided.

We had make the following preventive maintenance table available with tasks that should be followed during the period of use of the equipment. This information will help to increase the operating life of the equipment.

During the storage period the engines should be cared for as recommended by the manufacturer:

Electrical - care against moisture/humidity.

Diesel - disengage motor-pump set and leave the engine running for 15 minutes every 15 days. More information can be found in the manufacturer's manual.

Preventive Maintenance Table - Jockey System					
Item	Description	Weekly	Weekly	Annually	Biannual
1	Test Functioning – Manual Mode	X			
2	Test Functioning – Automatic Mode	X			
3	Test Signalization And Alarms		X		
4	Verify Bearing lubrication (if applicable)		X		
5	Tightening of screws and connections of the panel			X	

Preventive Maintenance Table - Electric System					
Item	Description	Weekly	Weekly	Annually	Biannual
6	Test Functioning – Manual Mode	X			
7	Test Functioning – Automatic Mode	X			
8	Test Signalization And Alarms		X		
9	Verify Bearing lubrication (if applicable)		X		
10	Clean Electric Motor Connections			X	
11	Verify Contact Of Protection Fuse			X	
12	Tightening of screws and connections of the panel				X

Preventive Maintenance Table - Diesel System					
Item	Description	Weekly	Weekly	Annually	Biannual
13	Test Functioning – Manual Mode				
14	Test Functioning – Automatic Mode				
15	Drain Fuel Filter	X			
16	Check Water Level In The Radiator	X			
17	Check Lubricating Oil Level	X			
18	Check for Possible Leakage in the Motor	X			
19	Check Connections and Hoses in the Motor	X			
20	Turn On Equipment For 30 Minutes	X			
21	Check Battery's Water Level	X			
22	Test Signalization And Alarms		X		
23	Check Tightening of Hoses and Cables		X		
24	Clean Cables and Battery		X		
25	Check Tightening on Motor and Radiator Protectors		X		
26	Change Lubricated Oil			X	
27	Change Fuel Filter			X	
28	Change Air Filter			X	
29	Readjust Motor Valve				X
30	Check the State Condition of Vibration Dampers				X
31	Test and Clean Nozzles				X
32	Change Fan Belt				X
33	Change Coolant				X
34	Test Injector Pump				X
35	Drain and Clean Fuel Tank				X
36	Check Oil Level for Pump Bearings		X		

Note 1: Disconnect cables and batteries when not in use (uncoupled pump/maintenance)

Note 2: Use Vaseline on battery connectors