

STAZIONE DI COMPRESSIONE

COMPRESSOR STATION



Natural gas is transported from production to consumption areas via pipelines, with a 75 bars pressure.

All along the kilometers, pressure inside the pipe drops, that's why every 100 kilometers compressor stations compensate this pressure loss.

❖ COMPRESSOR STATION OPERATION

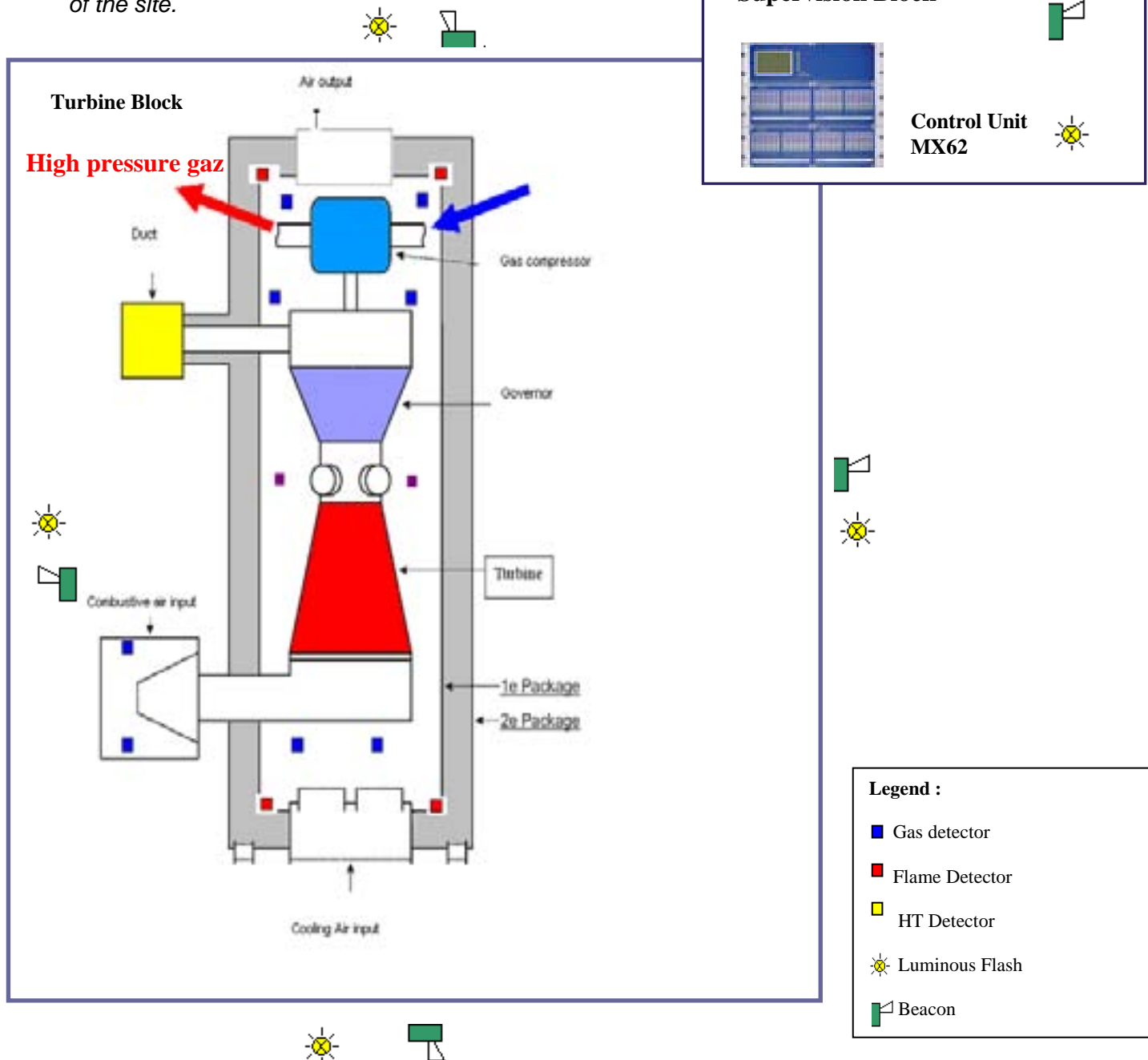
Two types of machines are used to compress natural gas: **electro-compressor** and **turbo compressor**. The difference is due only to the compressor drive mode

Turbocompressor	Electro-Compressor
<div data-bbox="264 1245 799 1615" data-label="Diagram"> </div> <p data-bbox="185 1693 850 1890">A turbine is high speed gas combustion driven, causing the rotation of the axis linked to the compressor which, due to the centrifuge force, moves air toward the periphery and creates a depression in the center and the gas pressure increase.</p>	<div data-bbox="954 1263 1422 1547" data-label="Diagram"> </div> <p data-bbox="876 1680 1485 1877">The compressor is driven by a belt (linked to the engine). The principle is easy: 2 rotors (one on both is mechanical), turns in opposite direction to decrease the gas volume in the chamber. As the gas has one exit, it is compressed until the pressure is sufficient.</p>

❖ WHERE TO POSITION THE MONITORS

You could find below a location example and the different steps to place the detector as well as possible.

The implementation will be validate by the person in charge of the site.



❖ RISKS AND GAS DETECTED

- **Methane leak**, for example in case of pipeline corrosion.
 - **Explosion risks**
- ⇒ **Need to combine gas and flame detection**

Process:

1: Methane is lighter than air (density 0.6) so you must place your detectors at the ceiling.

- 2: Identify the gas leak sources and determine:
- Environment with high temperature (HT) or standard
 - Permanent or occasional leak : infrared or catalytic

3: Control air input (combustive and cooling)

4 : Control air output

5: Place the flame detector upward and looking down to supervise the turbine and the inflammation risks. Don't forget to consider the :





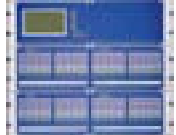
- Obstacle presence which could hide fire
- Maximale detection distance
- Possible false alarm source (...)

6: Place the control unit in safe area, generally in the supervision block.

Remark: no regulation imposes the number of detector. The implementation is the responsibility of the site manager.

❖ SOLUTIONS AND ADVANTAGES

Here the equipment which **INDUSTRIAL SCIENTIFIC OLDHAM** recommends for the compressor station:

Gas detection			Flame detection	Control Unit
				
OLCT IR SIL2	OLCT50 SIL2	OLC 50 HT SIL2	SHARPEYE : IR3 SIL2	MX62 SIL3

- The infrared detector **OLCT IR**: used because of a reduced maintenance and an appreciable cost reduction
- The catalytic detector **OLC 50D HT** : for a turbo compressor because of the high temperature (up to 200°C)

Note: Don't forget to use the WB interface module of the MX62 which converts a bridge signal into a 4-20mA signal.

- Flame detector **SharpEye IR3** : 30 meter detection in less than 5 seconds for a 0.1m² methane fire and highest immunity to false alarm.
- The control unit **MX62** : to centralize information and activate the needed security system

With its calculation capabilities and its logic function treatment, the MX62 allows a system redundancy for a higher security. Here an example of data treatment used in French:

Legend detector	detector 1	detector 2	Action	Legend stade
0: normal operation without alarm	0	0	0	0 : Normal operation
1: detector in alarm	0	1	Stage 1	Stage 1: Alarm involving luminous flash and beacons action
D: detector in fault	0	D	Stage1	Stage 2: Alarm involving turbine stop.
	1	0	Stage1	
	1	1	Stage 2	
	1	D	Stage 2	
	D	0	Stage 1	
	D	1	Stage 2	
	D	D	Fault MX62	

❖ OTHER LOCALS TO MONITOR

- Odor Injection station

Role: These stations make it possible to give to odorless methane its characteristic odor. In France, these stations are at the gas connection on the territory; abroad, this application of a strong-smelling additive is carried out sometimes right before the distribution with the private individuals.

Risks and gas detected:

- toxic odorous agent THT Risk (tetrahydrothiophen)
- Methane leak
- Explosion risks

Recommended equipment:

As compressor station with OLCT60 and its display.

- Gas analysis laboratory

Role: To analyze the calorific value of gas (GCV) and the quality of gas

Risks and gas to be detected:

- Methane Leak
- Gases used for the control equipment (called gas instruments): Hydrogen/Nitrogen/Helium
- Lack of oxygen

Recommended equipment:

- Catalytic detector (because of hydrogen)
- Oxygen detector