

MECHANICAL VENTILATION IN GARAGES:

In March 2007 the complete Edification Technical Code (CTE) came into effect. Its health (HS) and security basic documents in case of fire state establish, among other issues, the standards for mechanical ventilation devices in garages.

Mechanical ventilation shall be done through depression and can be effectuated either by mechanical extraction or by mechanical extraction and impulsion.

The minimum healthy ventilation flow requested on this basic document is of 120l/s (432m³/h) for every parking place. This flow coincides with the denoted on the SI3.

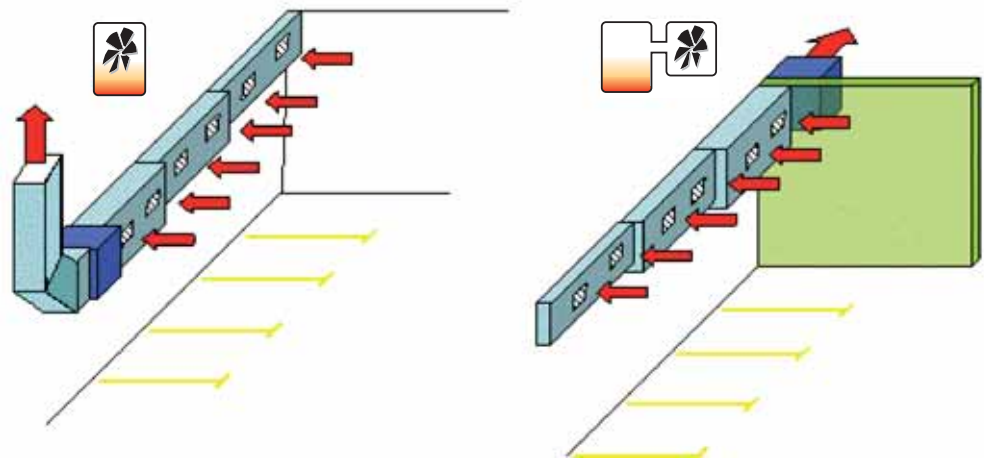
The number of extraction devices is based on the number of parking places (Table 1). Each duct net must have an extractor.

Parking places (P)	Duct nets
<15	1
15-P-80	2
P>80	1 + Integral (P/40)

Garages shall have an extraction and inlet opening for every 100m² of useful area. The distance between the closest extraction openings shall be below 10m.

Fans must have the F₃₀₀60 classification.

There exist 2 basic types of certified fans: those installed inside the hazardous area and those installed outside the hazardous area.



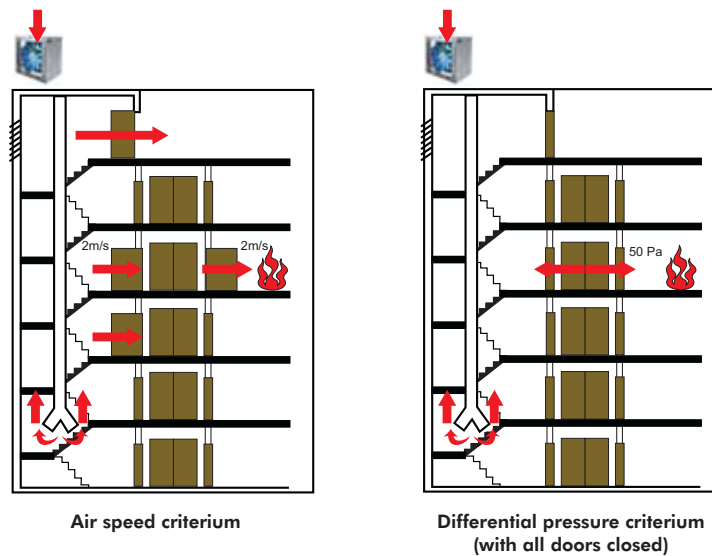
STAIR PRESSURIZATION:

The UNE-EN 12101-6 standard describes the differential pressure systems applied to escape ways, specially in protected stairs. These systems are based on the mechanical injection of outdoor air to the stair box, generating in this way a positive pressure that prevents the products of combustion from getting in the escape ways. In case of fire, the system helps in the evacuation process of the occupants by avoiding or reducing the vertical spread of the fire.

The needed flow will depend on the design conditions of the building. In general terms, an air speed through open sections of 0.75m/s will be used when the stair is used as an escape way for occupants, and of 2m/s when the stair is used by the fire extinguishing personnel.

The pressurization system must keep a differential pressure of 50Pa and overcome the pressure drop of the installation.

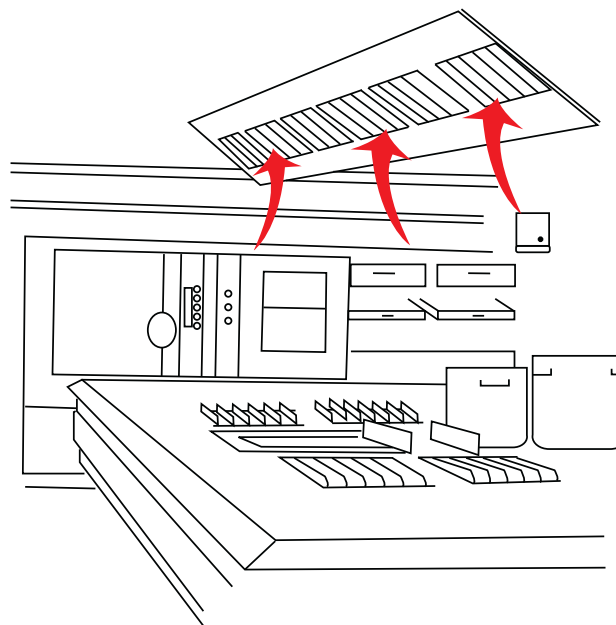
An automatic system consisting of a differential pressure probe (DPS), a frequency regulator (RFS) and the right fan according to the needs is recommended.



KITCHEN VENTILATION:

Industrial kitchens will be considered areas of special risk as long as the total installed power of the cooking elements is higher than 20Kw. These conducts must be independent from any other extraction or ventilation conduct. Smoke and heat mechanical extractors will be classified as F40090.

The extraction flow rate will be estimated from the uptake speed of the base of the range hood. The uptake speed of the base of the range hood will vary depending on its number of open sides. The following uptake speeds are recommended: 0.6m/s in island type range hoods (4 open sides), 0.45m/s in range hoods with 3 open sides, 0.35m/s in range hoods with 2 open sides and 0.25m/s in range hoods with 1 open side.

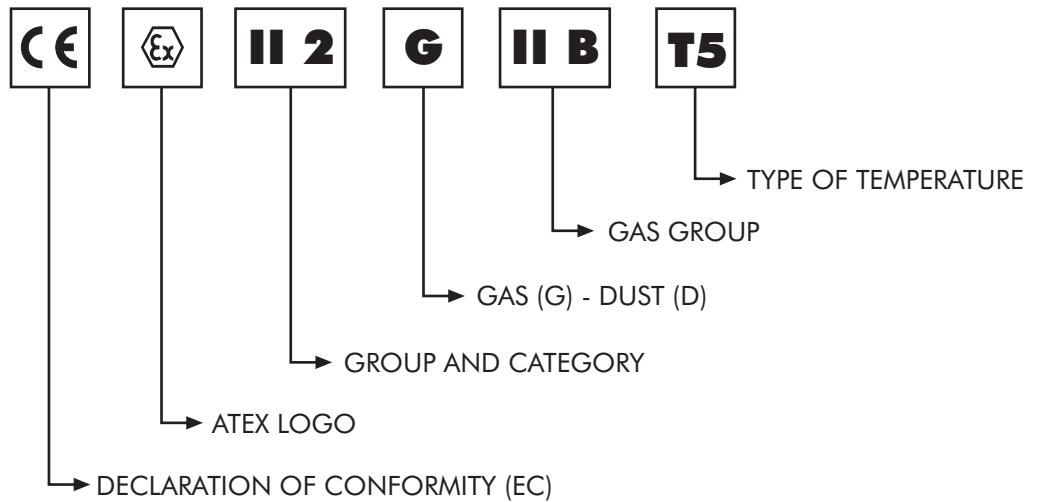


ATEX



ATEX fans are equipped with certified motors and spark proof devices. The purpose of these mentioned devices is to avoid accidental frictions between static and rotatory parts of the fan. Protection aluminium rings are used in axial fans protecting the impeller from the outer main cover. Friction between aluminium parts avoids sparks.

ATEX SYMBOLS ACCORDING TO CURRENT REGULATION 94/9/CE



MAIN POINTS TO SELECT AN ATEX FAN:

1. Fan Group

GROUP I: fans used for working in mine sites. Casals does not manufacture this particular type of fans.
 GROUP II: fans used in possible explosion environments. Casals manufactures this type.

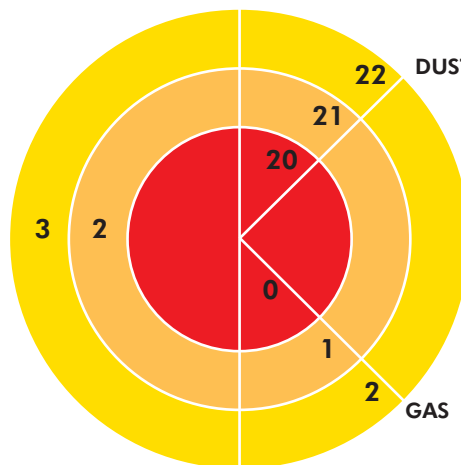
2. Fan Category according to risk zone.

GROUP AND CATEGORY

NOT AVAILABLE

II 2

II 3
 SELF-APPROVAL
 BY MANUFACTURER



RISK ZONE

ALWAYS PRESENT

PROBABILITY

ACCIDENTAL

Example 1: in a risk zone 1 (gas, explosion like environment) a fan from II 2G category is the suitable one (II equals group and G equals Gas).

Example 2: in a risk zone 22 (dust, accidental explosion environment) a fan from category II 3D (where II is the group and D means dust).

ATEX 



3) Group and type of temperature

Group: determines the explosion level of the gas.
 Type of temperature: determines the highest acceptable surface temperature on motor surface. Overcoming such temperature implies ignition risks of either the gas or the dust.

GAS

EXPLOSION GROUP	TYPE OF TEMPERATURE (maximum surface temperature allowed)					
	T1	T2	T3	T4	T5	T6
Ignition temperature >	450 °C	300 °C	200 °C	135 °C	100 °C	85 °C
I	Methane					
IIA Ignition energy higher than 0,18mJ	Acetone	I-amyl acetate	Amyl alcohol	Acetaldehyde		
	Ammonia	n-butane	Petrols			
	Benzene	n-butanol	Diesel oils			
	Etilacetato	1-butene	Heating oils			
	Methane	Propylacetate	n-hexane			
	Methanol	I-propanol				
	Propane	Vinyl chloride				
IIB Ignition energy 0,06 a 0,18 mJ	Touleno					
	Cyanide hydrogen	1.3-butadleno	Dimetileter	Dietileter		
		1.4-dioxane	Etiloglicol			
Coal Gas (lighting gas)	ethilene	Sulfide hydrogen				
IIC Ignition energy lower than 0,06mJ	Ethilene oxid					Carbon disulphur
	Hydrogen	Acethylene				

DUST

Product (dust)	Ignition temperature dust cloud	Ignition temperature for 5mm dust layer	Lower explosive limit (LEL)
Dust aluminium	530 °C	280 °C	15 g/m ³
Brown dust	380 °C	225 °C	60 g/m ³
Dust steel	310 °C	300 °C	125 g/m ³
Cereals	420 °C	290 °C	60 g/m ³
Wood dust	400 °C	300 °C	30 g/m ³
Dust milk	440 °C	340 °C	60 g/m ³
Paper	540 °C	300 °C	30 g/m ³
PVC	530 °C	380 °C	60 g/m ³
Soot	620 °C	385 °C	60 g/m ³
Sulfide	280 °C	280 °C	30 g/m ³
Starch	440 °C	290 °C	125 g/m ³
Hard coal	590 °C	245 °C	60 g/m ³
Wheat flour	480 °C	450 °C	125 g/m ³
Dust zinc	570 °C	440 °C	250 g/m ³

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Maximum surface temperature.
(Necessary indication for equipment which will be used in explosive dust environments)
Maximum surface temperature in case of failure for an equipment which is in contact with dust:

- Temperature limit 1. 2/3 of the minimum ignition temperature for the existing dust.
- Temperature limit 2. Minimum ignition temperature for a 5mm powder layer less 75 Kelvin.

The lowest limit temperature in both cases has to be higher than the maximum temperature on the device's surface.

For example, in a wheat flour case:

Temperature limit 1 = $2/3 \times 480 = 320 \text{ }^\circ\text{C}$

Temperature limit 2 = $450 - 75 = 375 \text{ }^\circ\text{C}$

Maximum temperature of device's surface = 320°C

Lower explosion limit (LEL) is in this case 125g/m^3 . Below this concentration there's no explosion risk.

The following types of temperature are determined following the same criteria as with Gas:

Temperature class

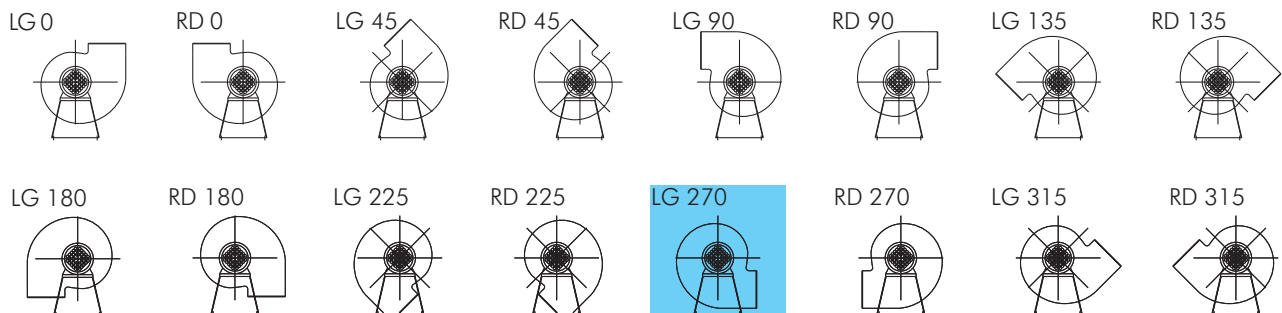
Types of temperature	Casing surface maximum temperature with ambient temperature 40°C
T1	$450 \text{ }^\circ\text{C}$
T2	$300 \text{ }^\circ\text{C}$
T3	$200 \text{ }^\circ\text{C}$
T4	$135 \text{ }^\circ\text{C}$
T5	$100 \text{ }^\circ\text{C}$
T6	$85 \text{ }^\circ\text{C}$

Following the same wheat flour example, the type of temperature is T2.
Furthermore, the motors (engines) for zone 21 have to be IP6X (dust tight).

The client is responsible for defining the potential explosive zones where the fans have to be installed.

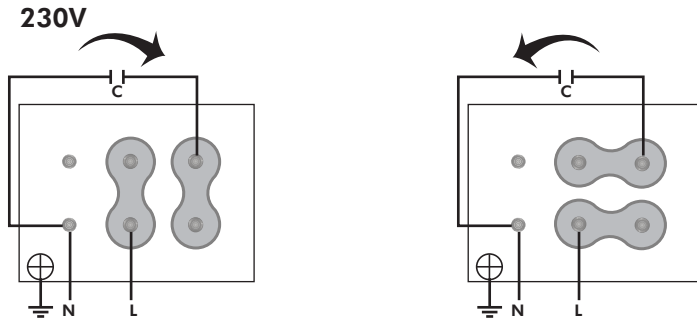
STANDARD ASSEMBLY POSITION

Standard fan assembly position is LG270.



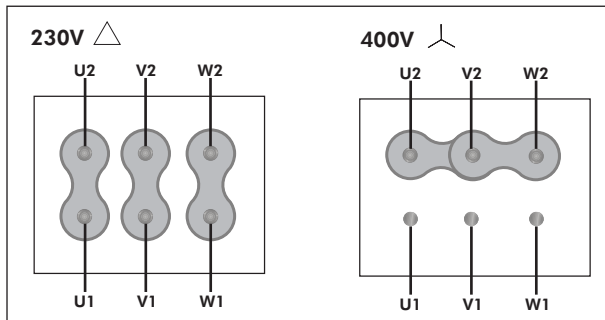
CONNECTION DIAGRAMS

SINGLE PHASE MOTORS

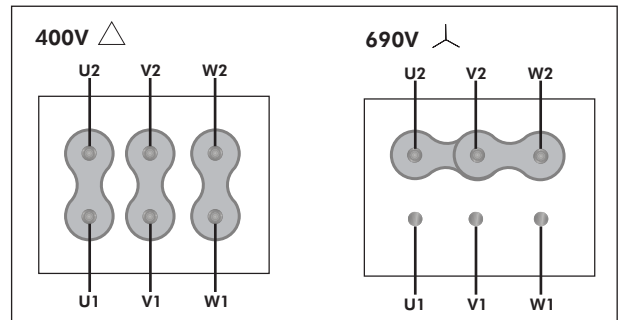


THREE PHASE MOTORS

230/400V

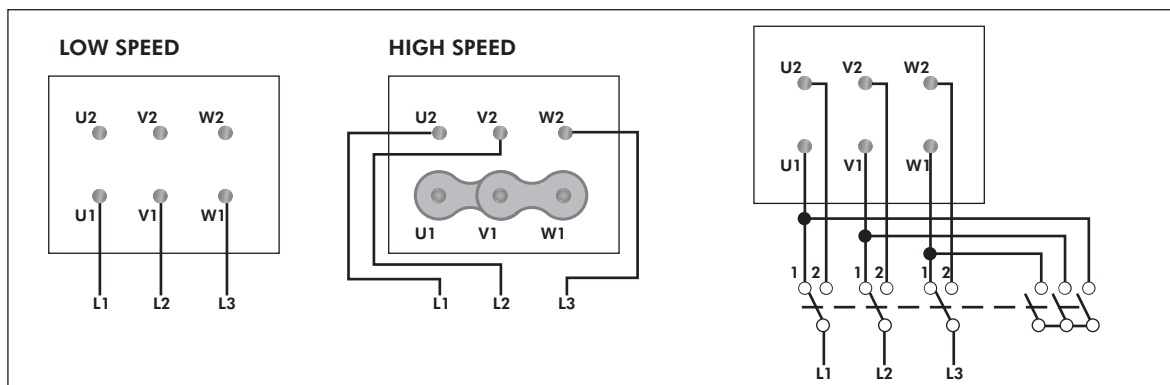


400/690V

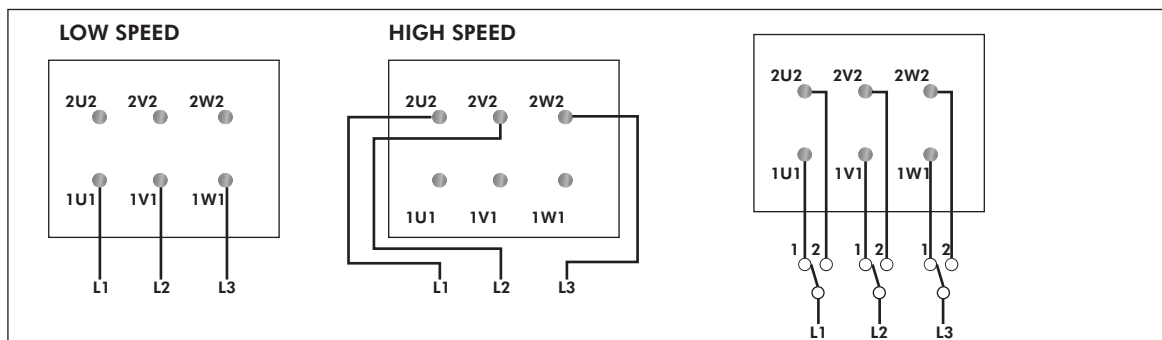


2 SPEEDS MOTORS

400V DAHLANDER (Y,YY)

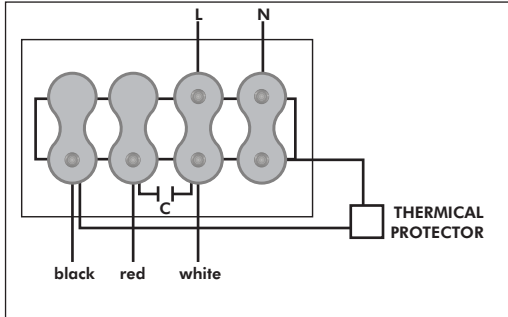


400V SEPARATE WINDINGS

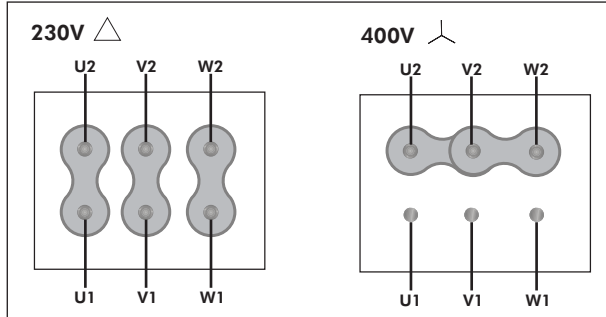


BD FAN

SINGLE PHASE MOTOR

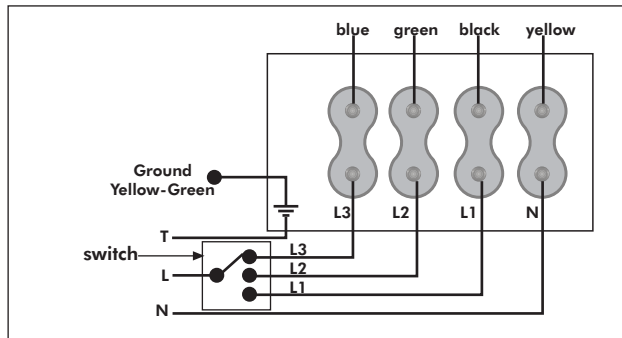


THREE PHASE MOTOR



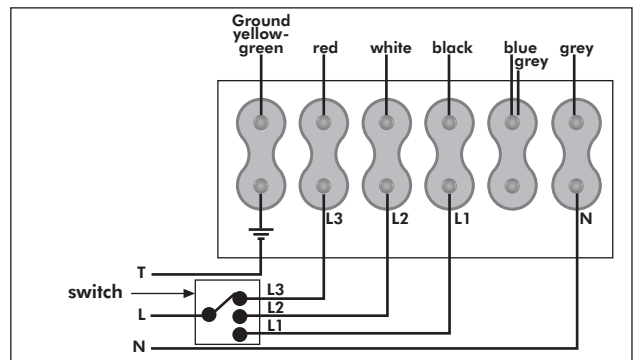
3 SPEED BD FAN

BD 25/25 M6 1/3 3V
BD 2/28 M6 1/3 3V

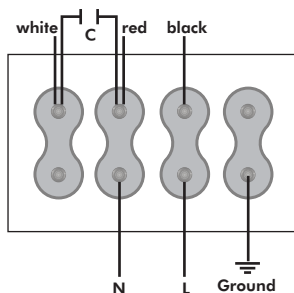


BD 19/19 M4 1/5 3V
BD 19/19 M6 1/10 3V
BD 25/25 M4 1/2 3V
BD 25/25 M6 1/5 3V

BD 28/28 M4 3/4 3V
BD 28/28 M6 1/2 3V
BD 33/33 M6 3/4 3V
BD 33/33 M6 1 3V

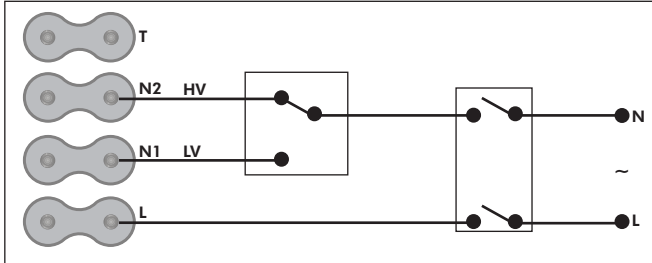


BT, SB AND SBE FANS

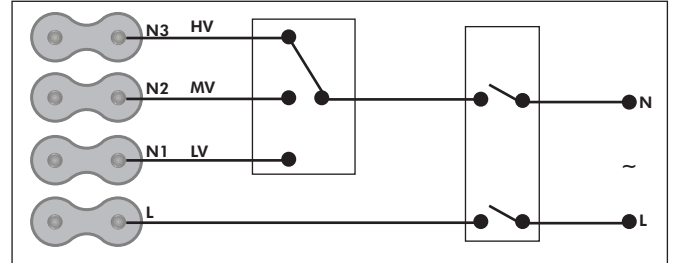


BT ILF FAN

BT ILF 4, 5, 6



BT ILF 8



TIMER

