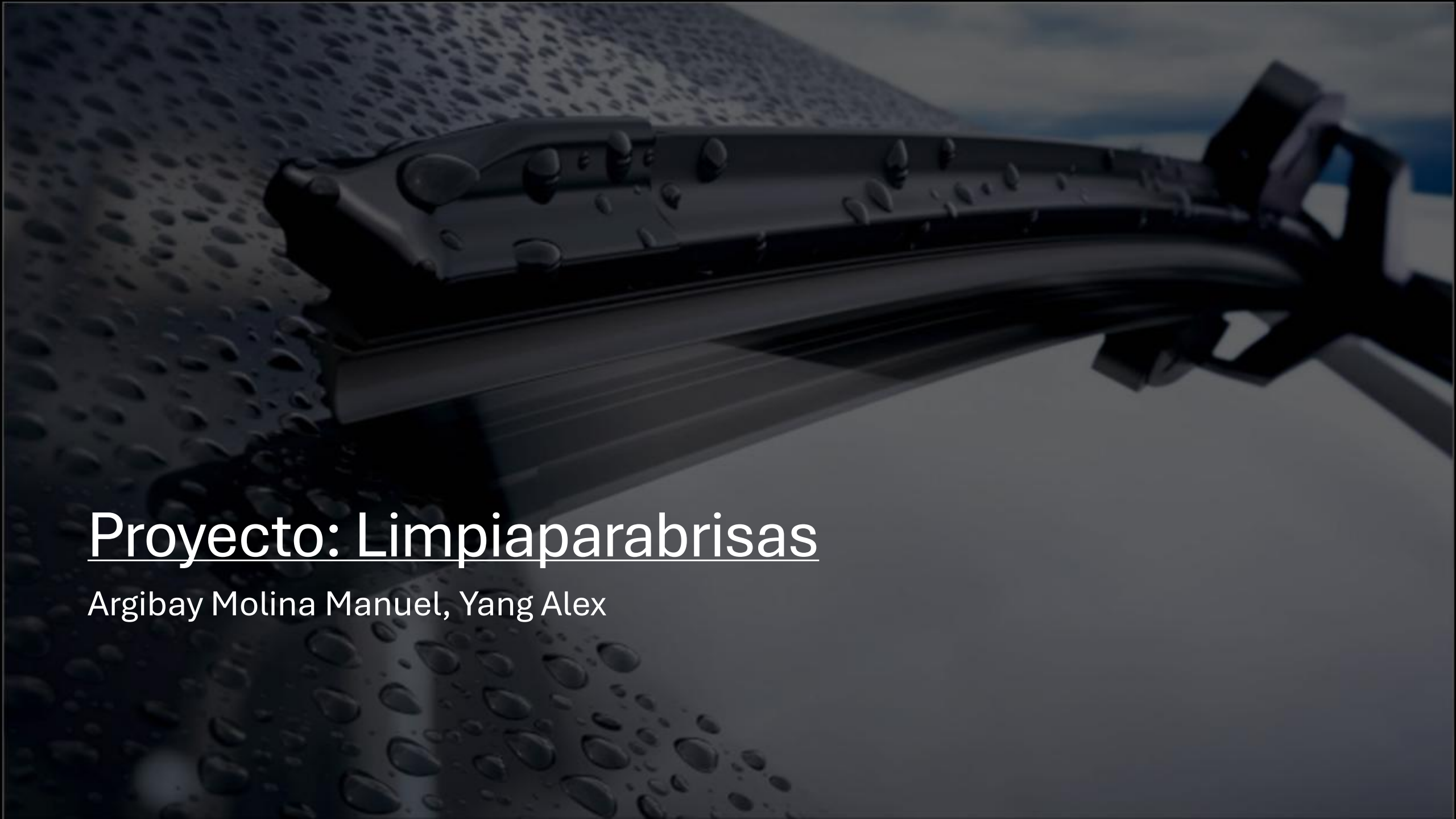


Proyecto: Limpiaparabrisas

Argibay Molina Manuel, Yang Alex

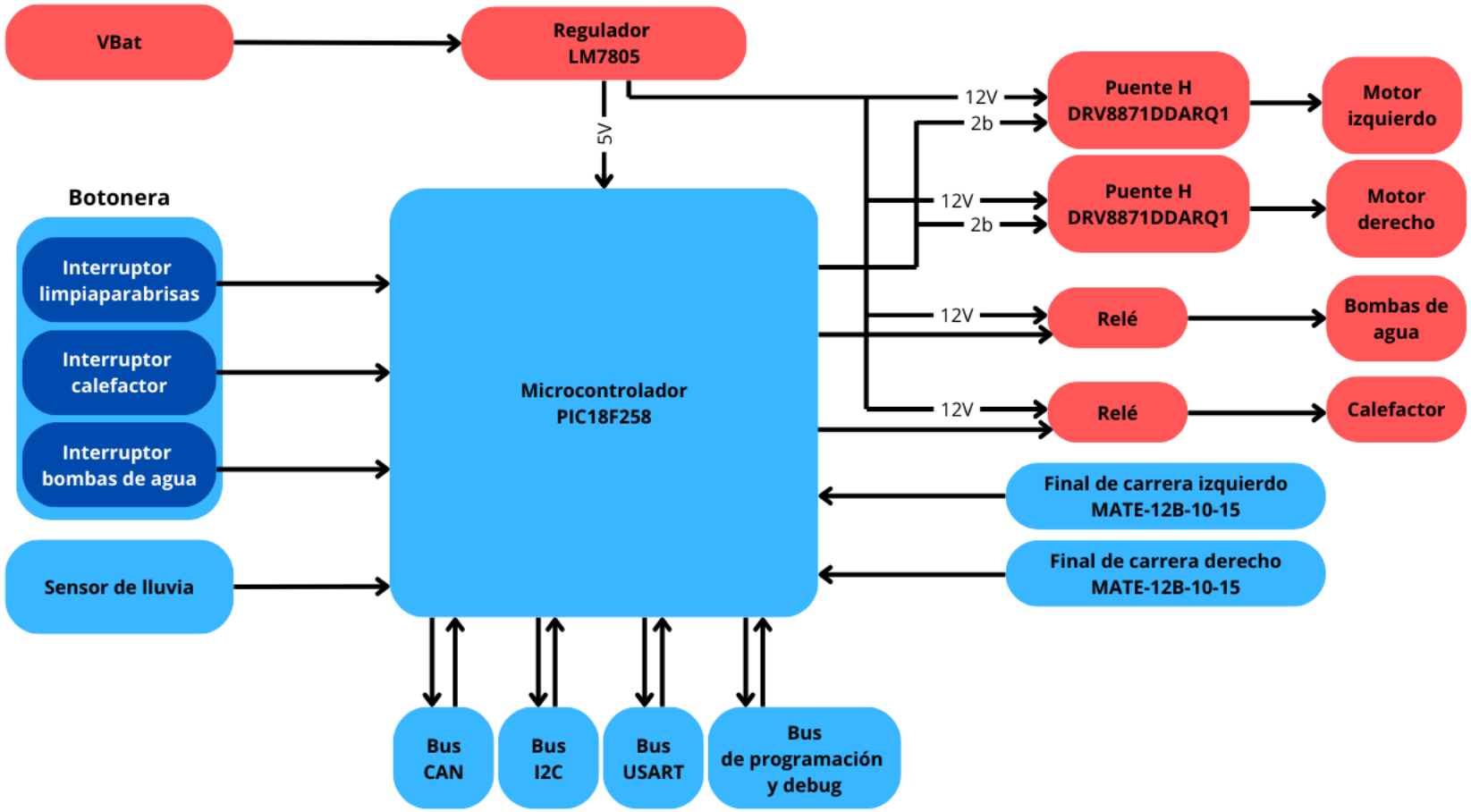
Funcionalidad y Objetivos

- Mantener el parabrisas limpio y libre de elementos que obstruyan la visión
    - Escobillas limpiaparabrisas controladas por motores.
    - Bombas de líquido limpia parabrisas.
    - Calefactor que evita el empañamiento del parabrisas.
    - Interfaz manual mediante botonera
- Diseñar e implementar este sistema en una PCB.
    - Garantizar funcionamiento y fiabilidad en el producto.
    - Optimización de energía.
    - Optimización de costos.

Componentes

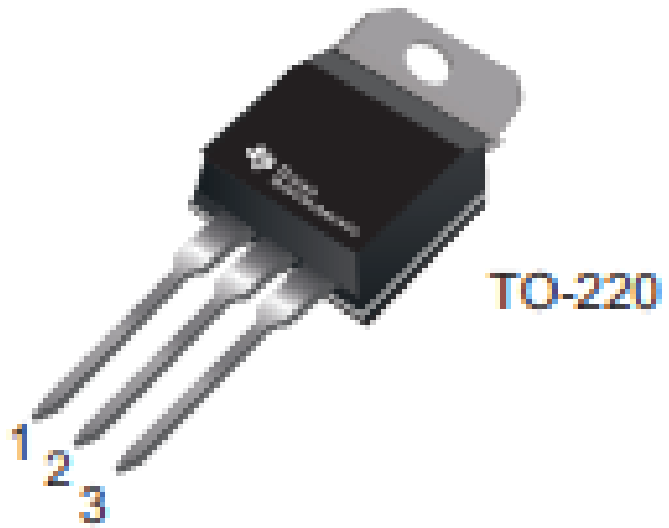
- Microcontrolador PIC18FXX8
- Transceptor MCP2551
- Bus de programación y debug
- Bus CAN
- Bus I^2C
- Botonera
- Fuente de 12V
- Regulador de tensión
- 2 motores DC
- 2 bombas de líquido limpiaparabrisas
- Sensor digital de lluvia
- Calefactor del vidrio
- 2 puentes “H”
- 2 relés electromagnéticos
- 2 finales de carreras magnéticos

Diagrama de Bloques



Regulador de tensión

LM7805



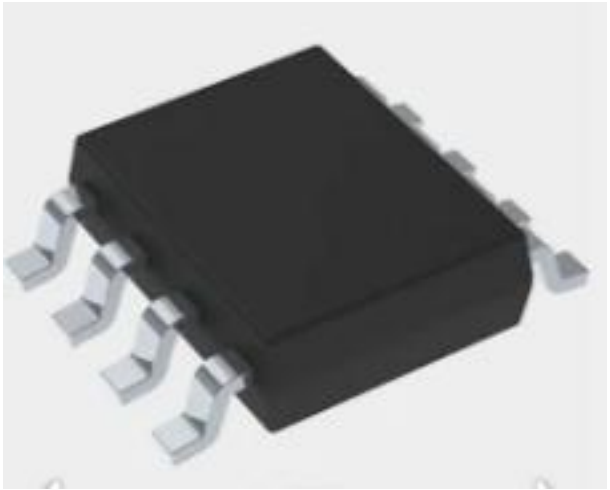
PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_O	Output voltage	T_J = 25°C, 5 mA ≤ I_O ≤ 1 A		4.8	5	5.2	V
		P_D ≤ 15 W, 5 mA ≤ I_O ≤ 1 A 7.5 V ≤ V_{IN} ≤ 20 V		4.75		5.25	V
ΔV_O	Line regulation	I_O = 500 mA	T_J = 25°C 7V ≤ V_{IN} ≤ 25V		3	50	mV
			Over temperature 8V ≤ V_{IN} ≤ 20V			50	mV
		I_O ≤ 1 A	T_J = 25°C 7.5V ≤ V_{IN} ≤ 20V			50	mV
			Over temperature 8V ≤ V_{IN} ≤ 12V			25	mV
ΔV_O	Load regulation	T_J = 25°C	5 mA ≤ I_O ≤ 1.5 A		10	50	mV
			250 mA ≤ I_O ≤ 750 mA			25	mV
		Over temperature, 5 mA ≤ I_O ≤ 1 A				50	mV
I_Q	Quiescent current	I_O ≤ 1 A	T_J = 25°C			8	mA
			Over temperature			8.5	mA
ΔI_Q	Quiescent current change	0°C ≤ T_J ≤ 125°C, 5 mA ≤ I_O ≤ 1 A			0.5		mA
		7 V ≤ V_{IN} ≤ 20 V	T_J = 25°C, I_O ≤ 1 A			1	mA
			Over temperature, I_O ≤ 500 mA			1	mA
V_N	Output noise voltage	T_A = 25°C, 10 Hz ≤ f ≤ 100 kHz			40		µV
$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	Ripple rejection	f = 120 Hz 8 V ≤ V_{IN} ≤ 18 V	T_J = 25°C, I_O ≤ 1 A	62	80		dB
			Over temperature, I_O ≤ 500 mA	62			dB
R_O	Dropout voltage	T_J = 25°C, I_O = 1 A			2		V
	Output resistance	f = 1 kHz			8		mΩ
	Short-circuit current	T_J = 25°C			2.1		A
	Peak output current	T_J = 25°C			2.4		A
	Average TC of V_{OUT}	Over temperature, I_O = 5 mA			−0.6		mV/°C
V_{IN}	Input voltage required to maintain line regulation	T_J = 25°C, I_O ≤ 1 A		7.5			V

Detector de lluvia

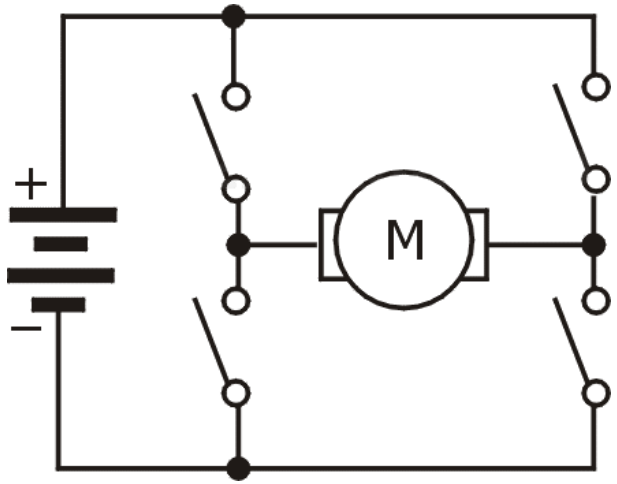
SEN0545

Puente H

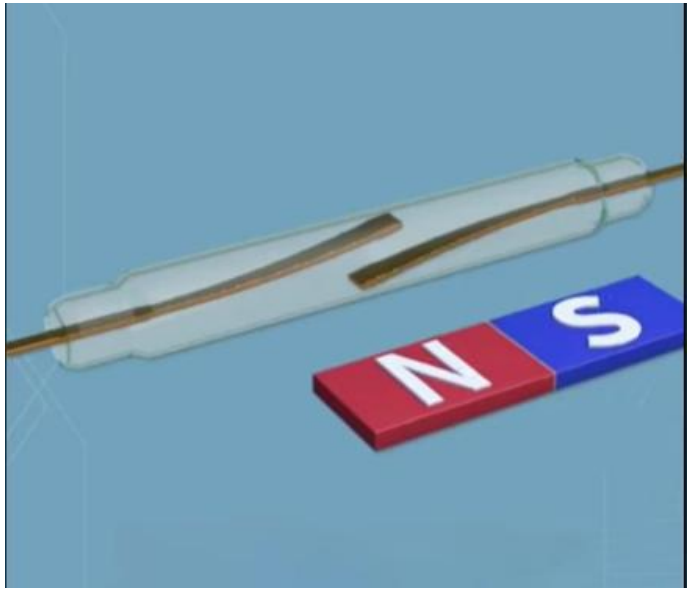
IN1	IN2	OUT1	OUT2	DESCRIPTION
0	0	High-Z	High-Z	Coast; H-bridge disabled to High-Z (sleep entered after 1 ms)
0	1	L	H	Reverse (Current OUT2 → OUT1)
1	0	H	L	Forward (Current OUT1 → OUT2)
1	1	L	L	Brake; low-side slow decay

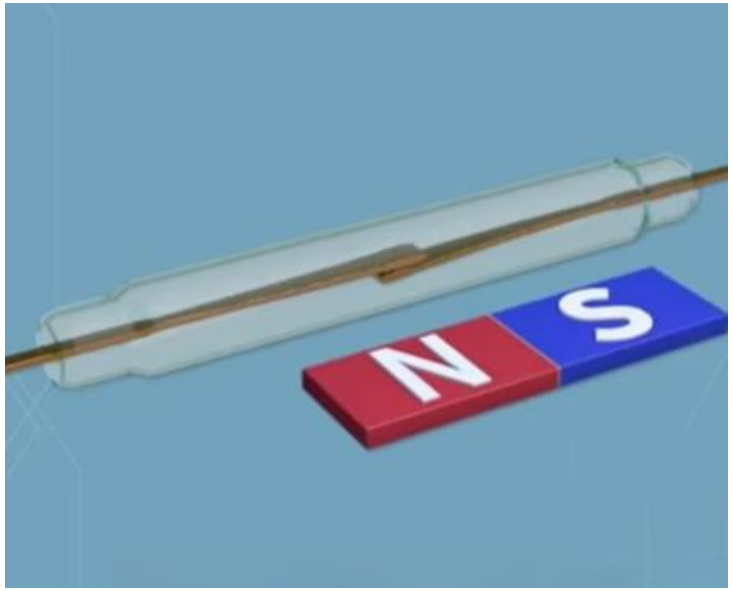


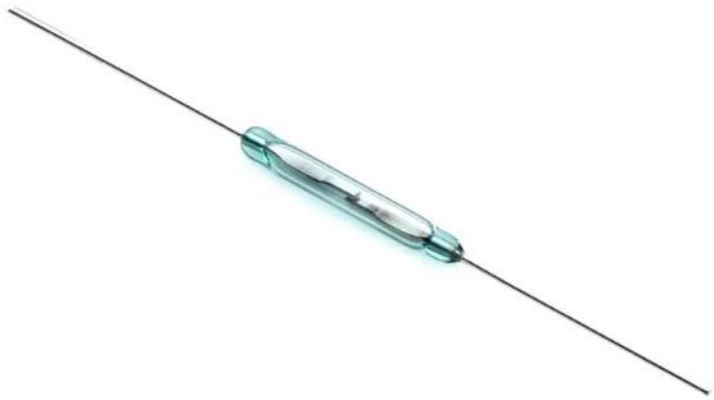
DRV8871DDARQ1



Final de Carrera magnético (Reed Switch)

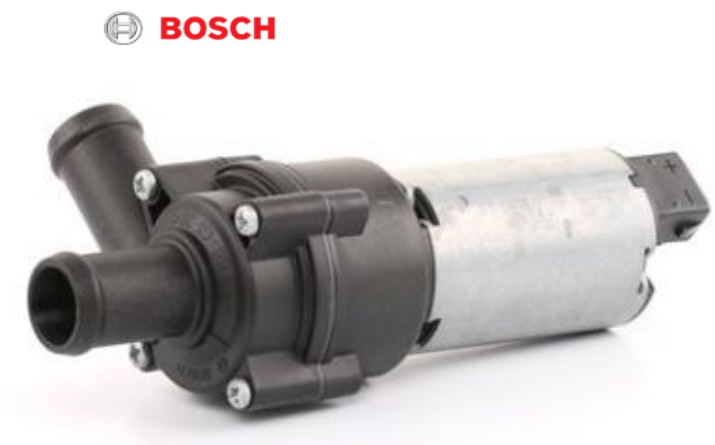






MATE-12B-10-15

Bomba, motores y calefactor



Bomba de líquido limpiaparabrisas

Motor de limpiaparabrisas de un Volkswagen (también marca Bosch)

Placa PTC

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