GOL 1.0 FLEX - Injeção Eletrônica

SISTEMA ME 7.5.20

Gol

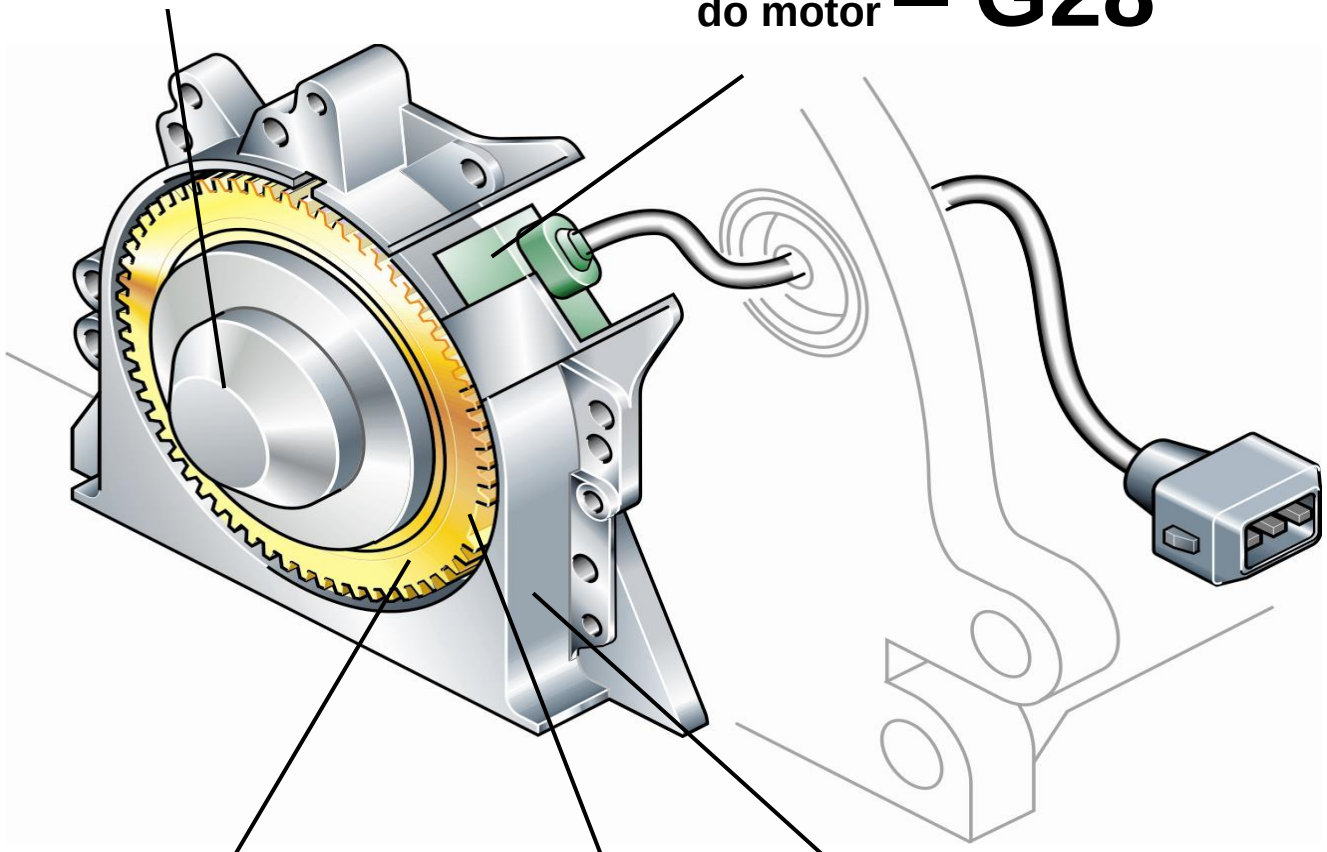
Professor SCOPINO

- Técnico e Administrador da Auto Mecânica Scopino
- Professor do Umec – Universo do Mecânico
- Ex-Professor do Senai
- Diretor do Sindirepa-SP
- Consultor do Jornal Oficina Brasil

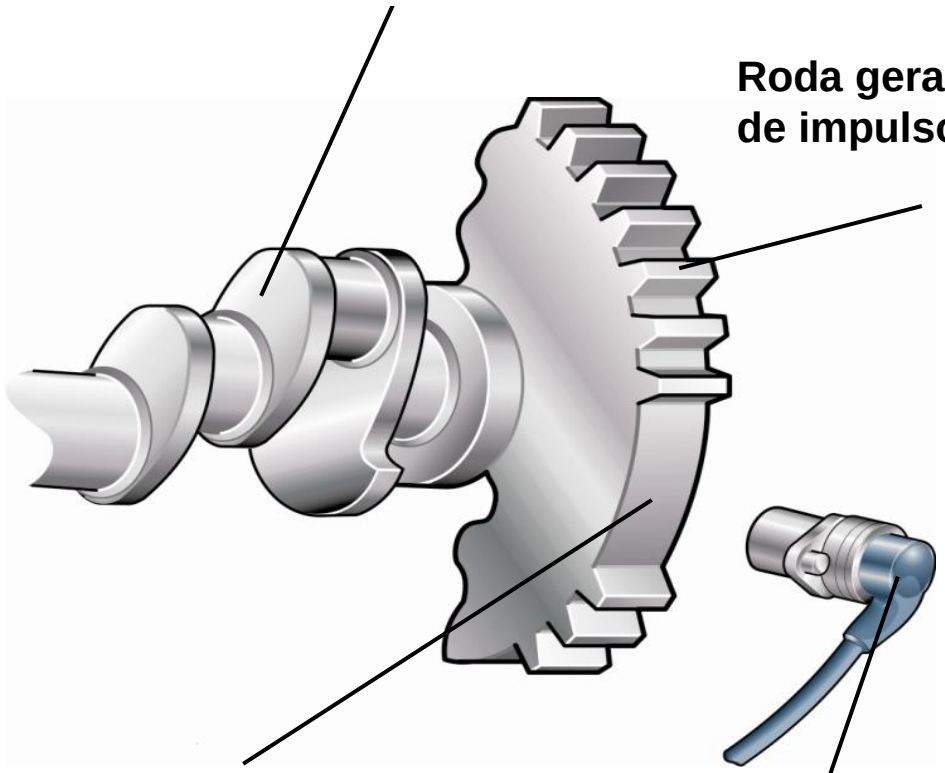
SINAIS DE ENTRADA

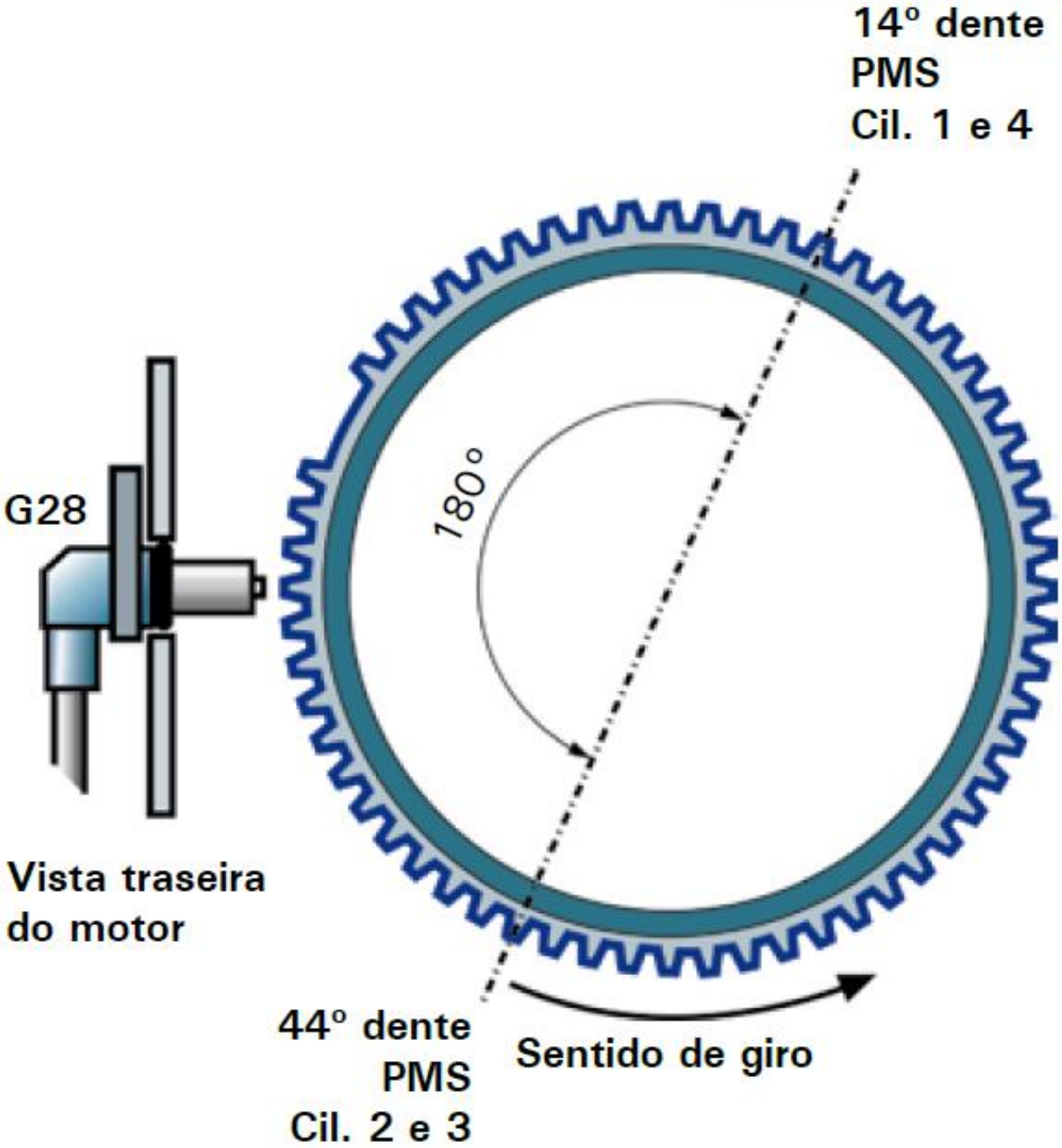
SENSOR DE ROTAÇÃO

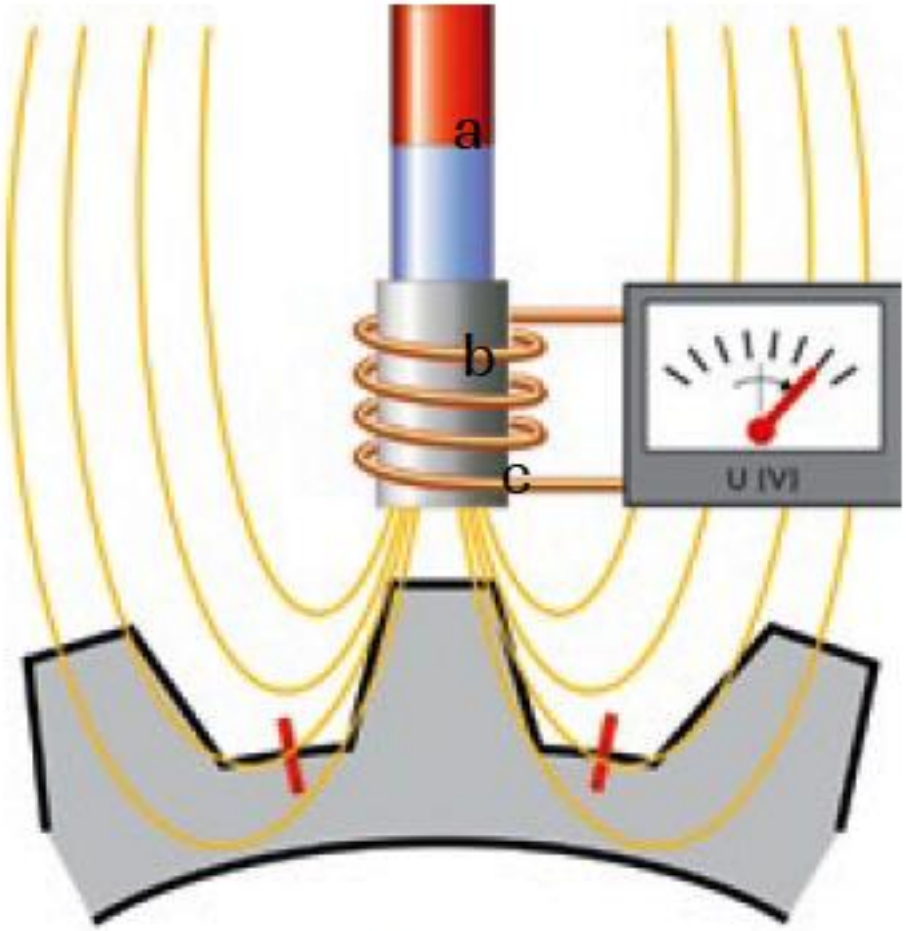
Sensor tipo *Hall*



Sensor tipo Indutivo



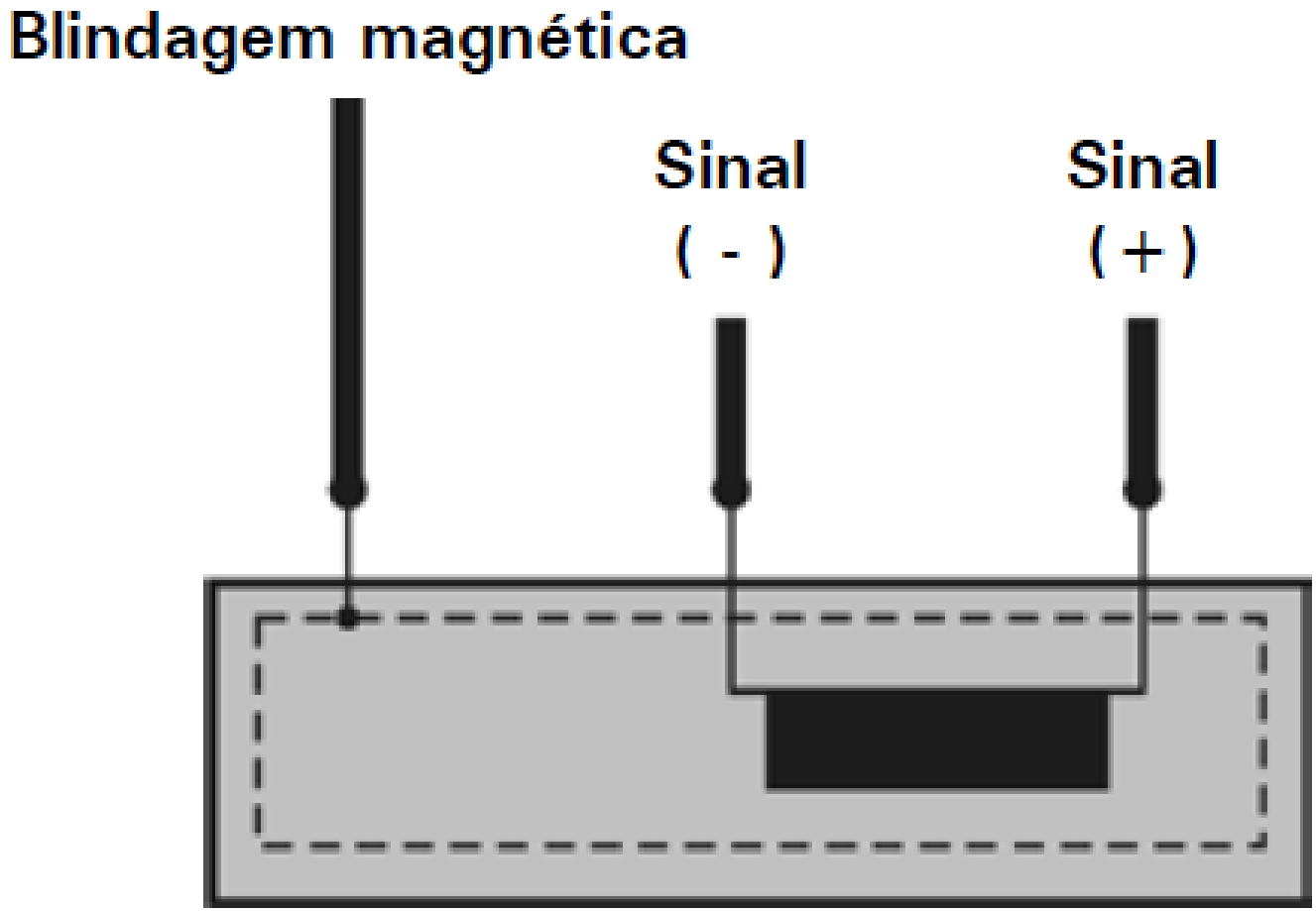

14º dente
PMS
Cil. 1 e 4
G28
180°
Vista traseira
do motor
44º dente
PMS
Cil. 2 e 3
Sentido de giro



d

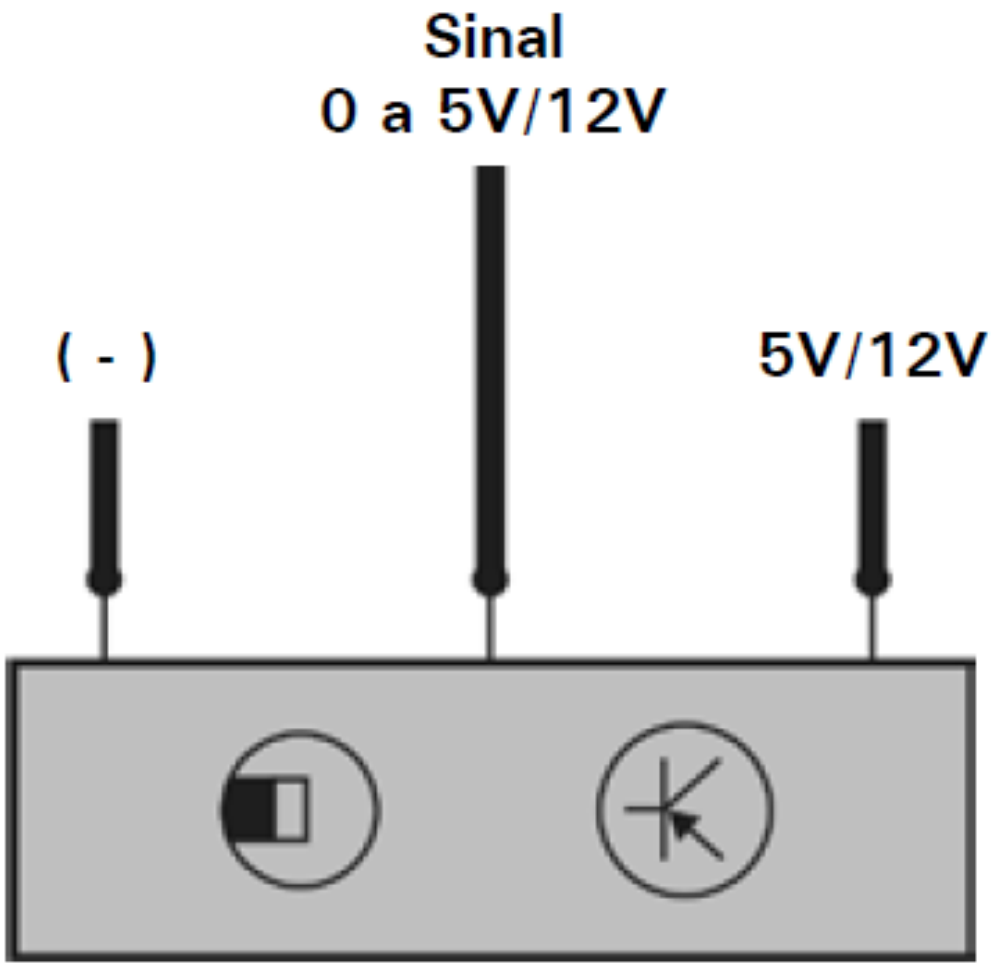
a - Ímã
b - Núcleo ferromagnético
c - Bobina
d - Roda geradora de impulsos

Simbologia do sensor no esquema elétrico



G28

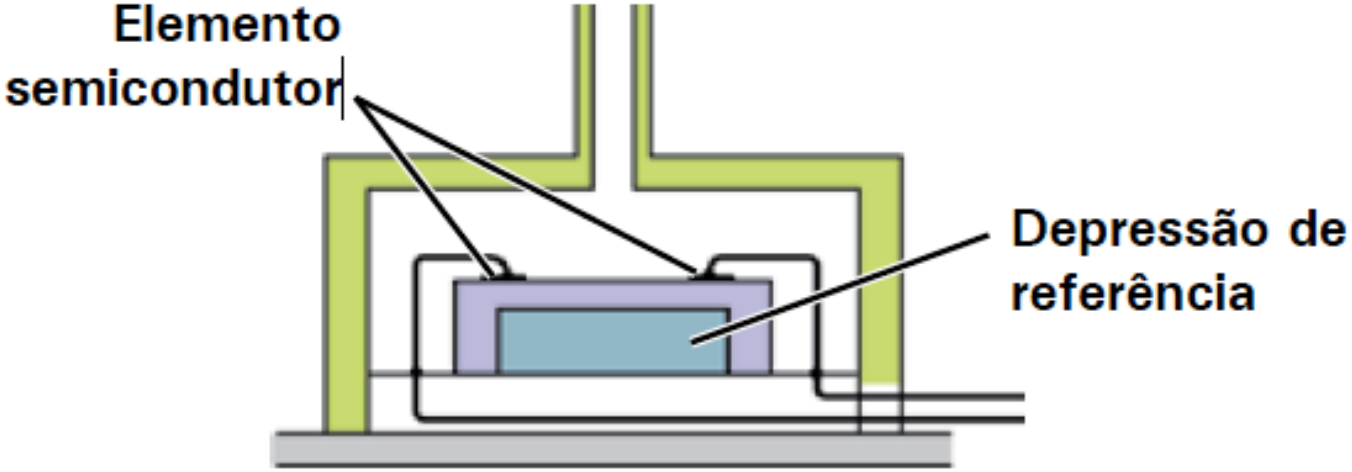
Simbologia do sensor no esquema elétrico

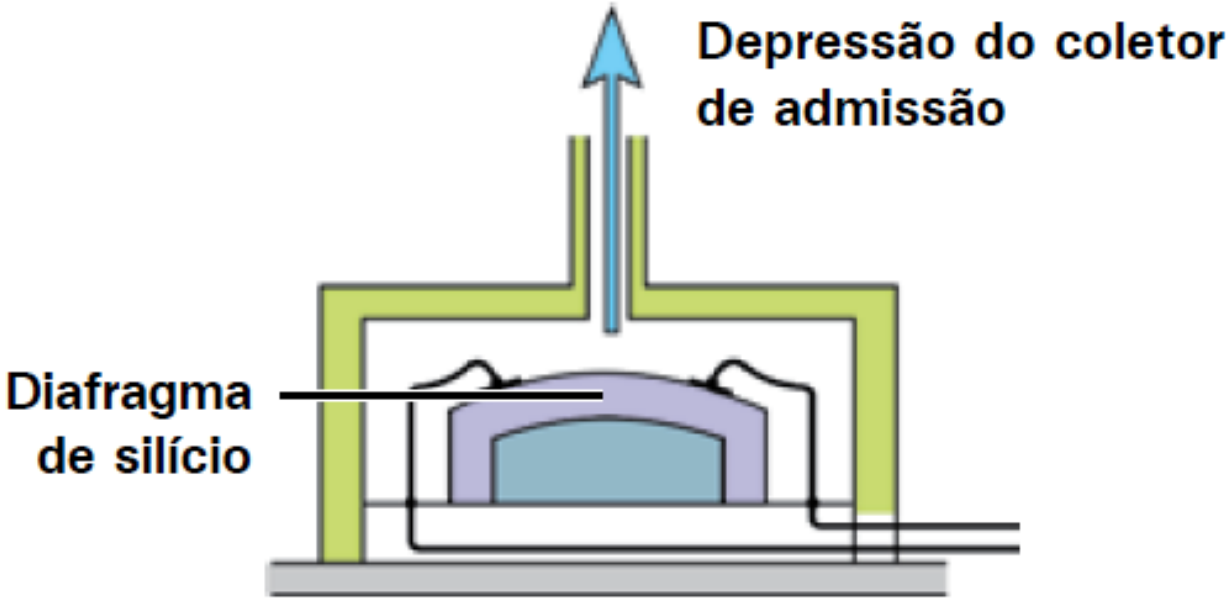


G28

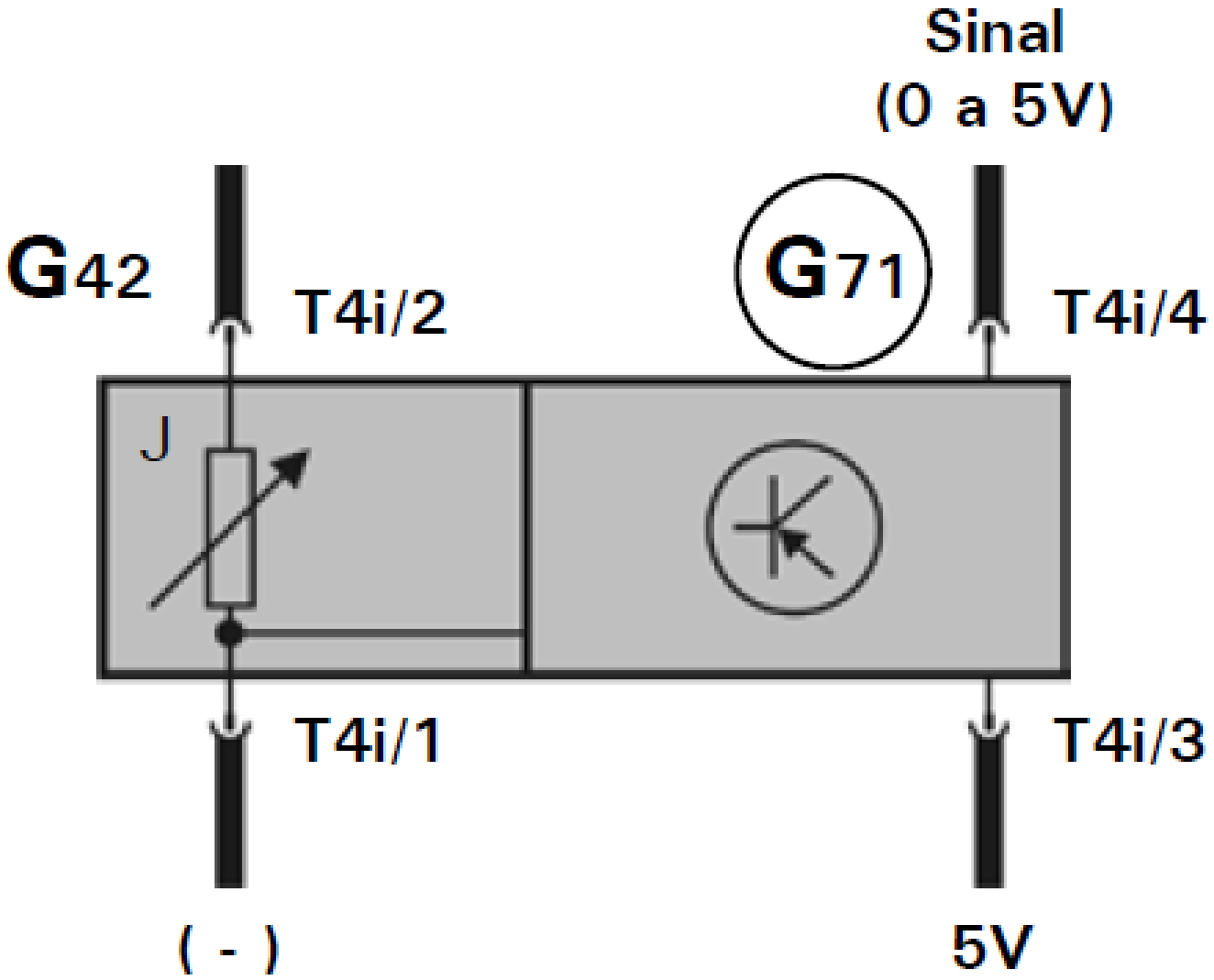
SENSOR DE PRESSÃO DO COLETOR DE ADMISSÃO

G 71


Elemento semicondutor
Depressão de referência

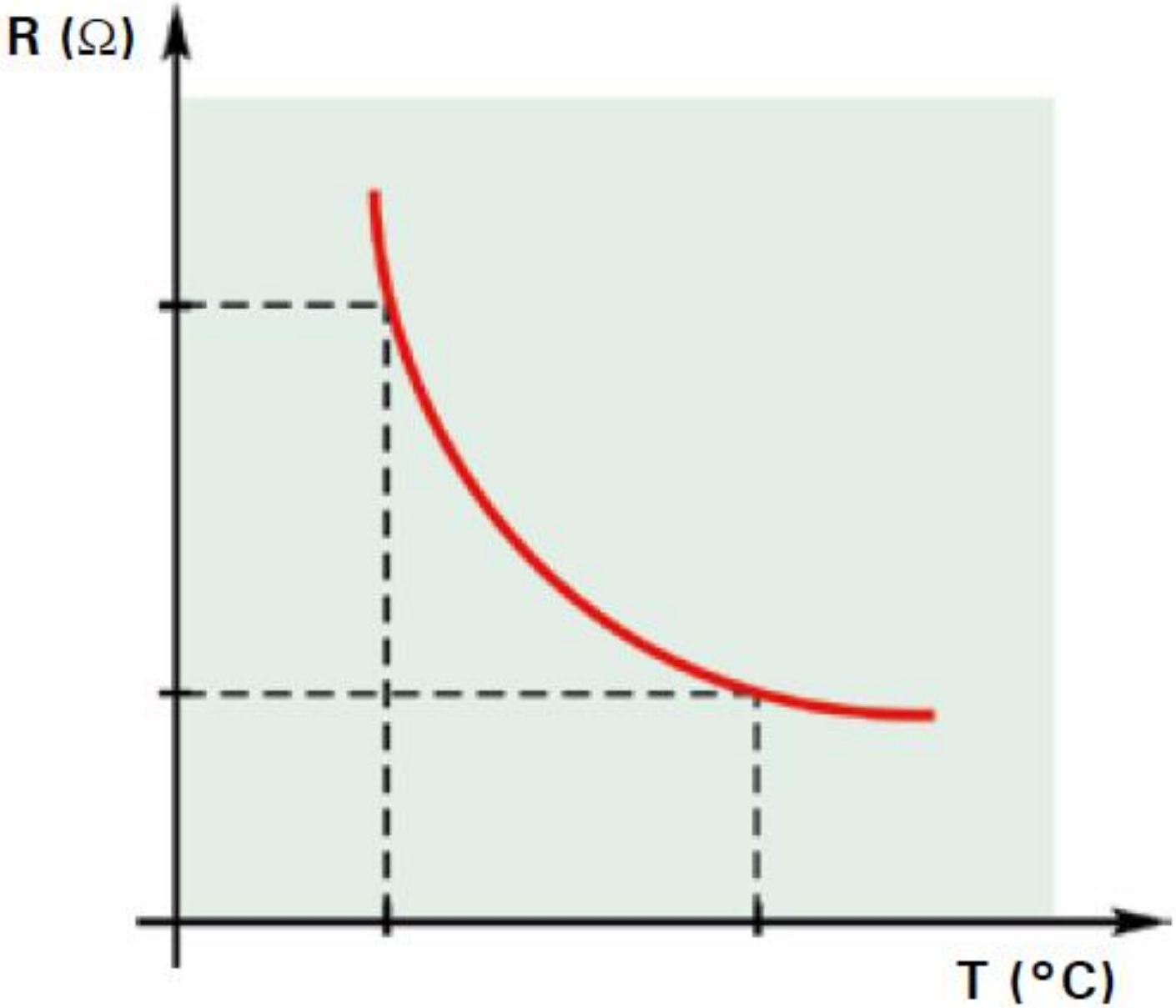

Depressão do coletor de admissão
Diafragma de silício

Simbologia do sensor no esquema elétrico

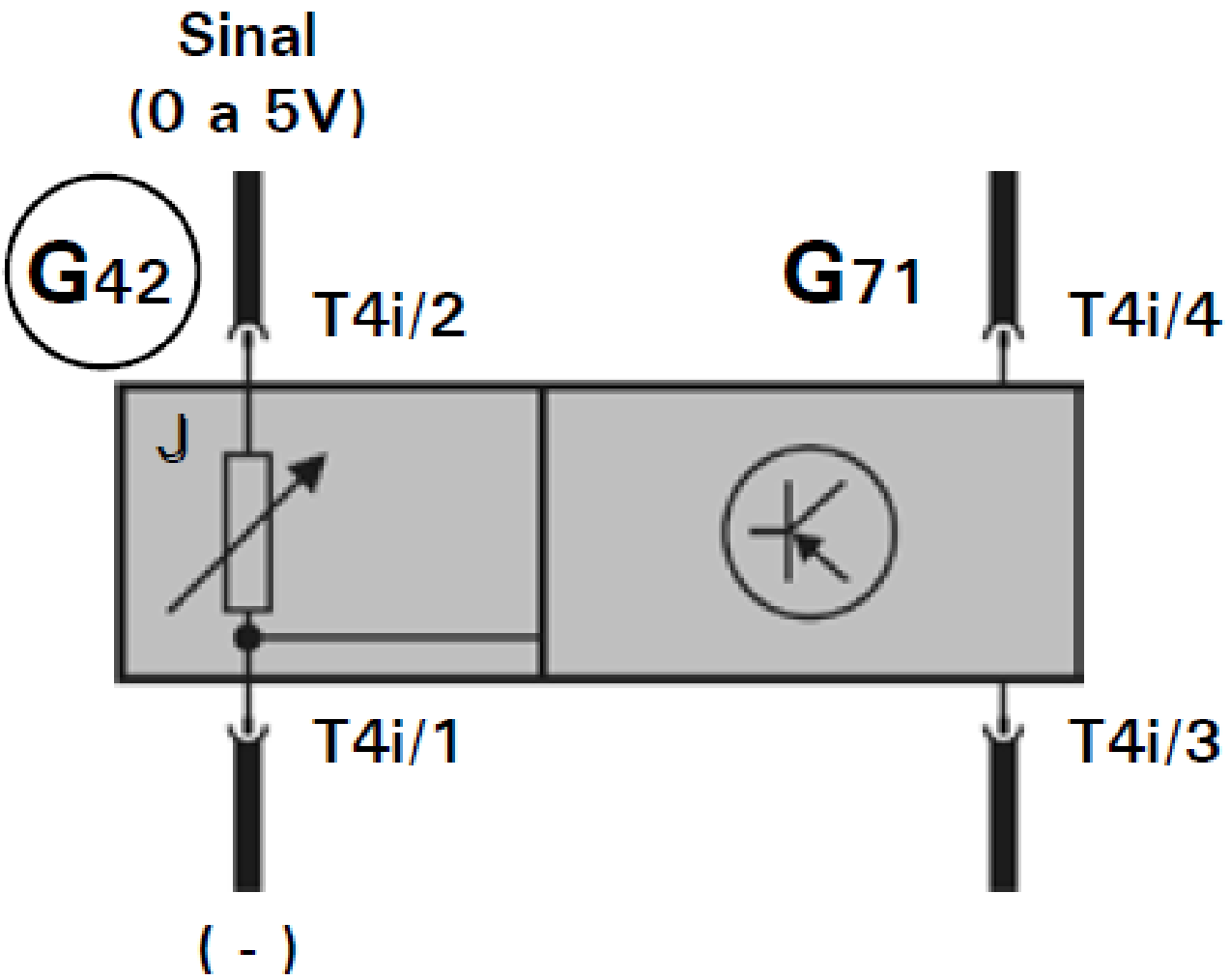


SENSOR DE TEMPERATURA DO AR DE ADMISSÃO

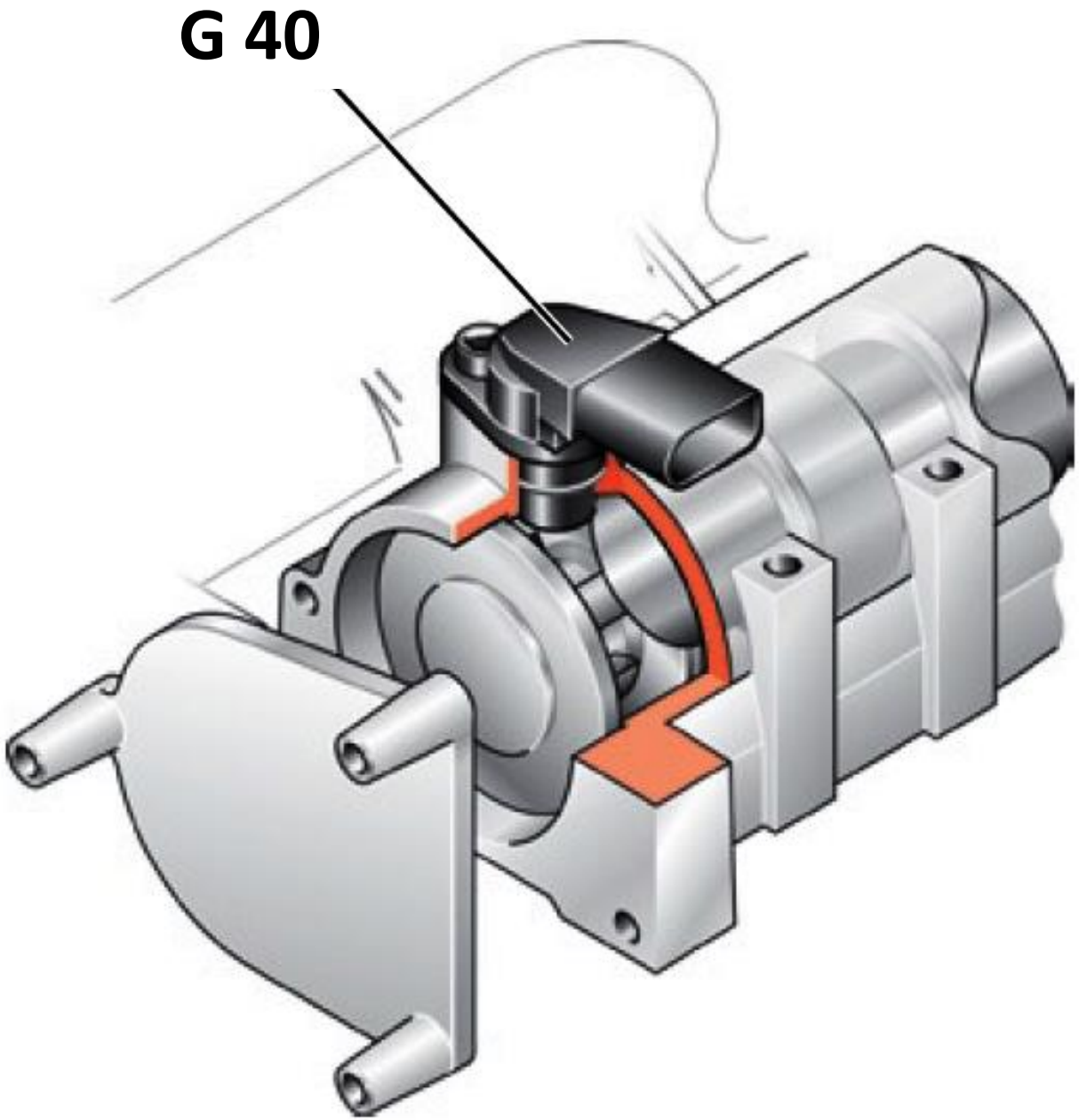
G 42

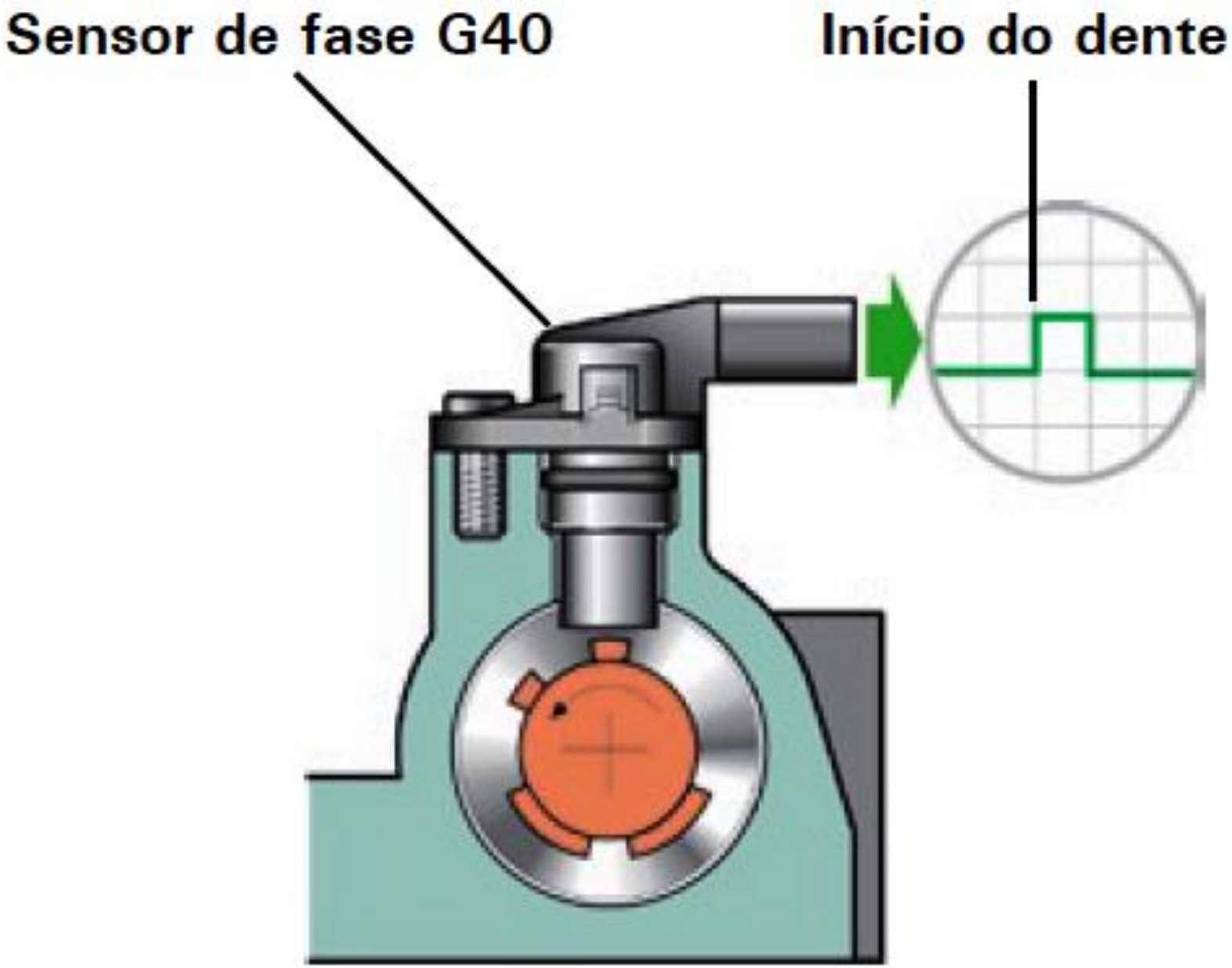

R (Ω)
T (°C)

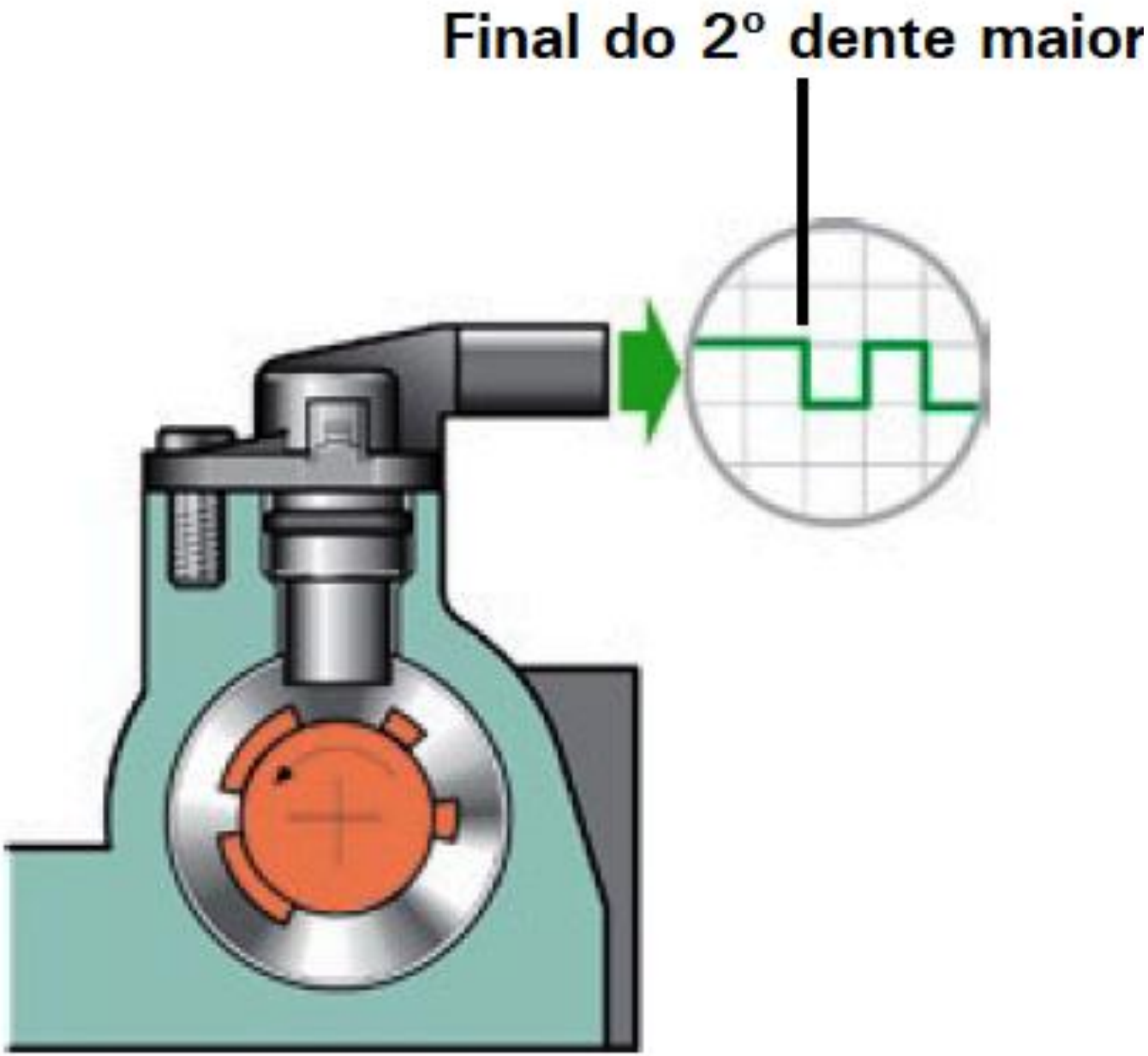
Simbologia do sensor no esquema elétrico



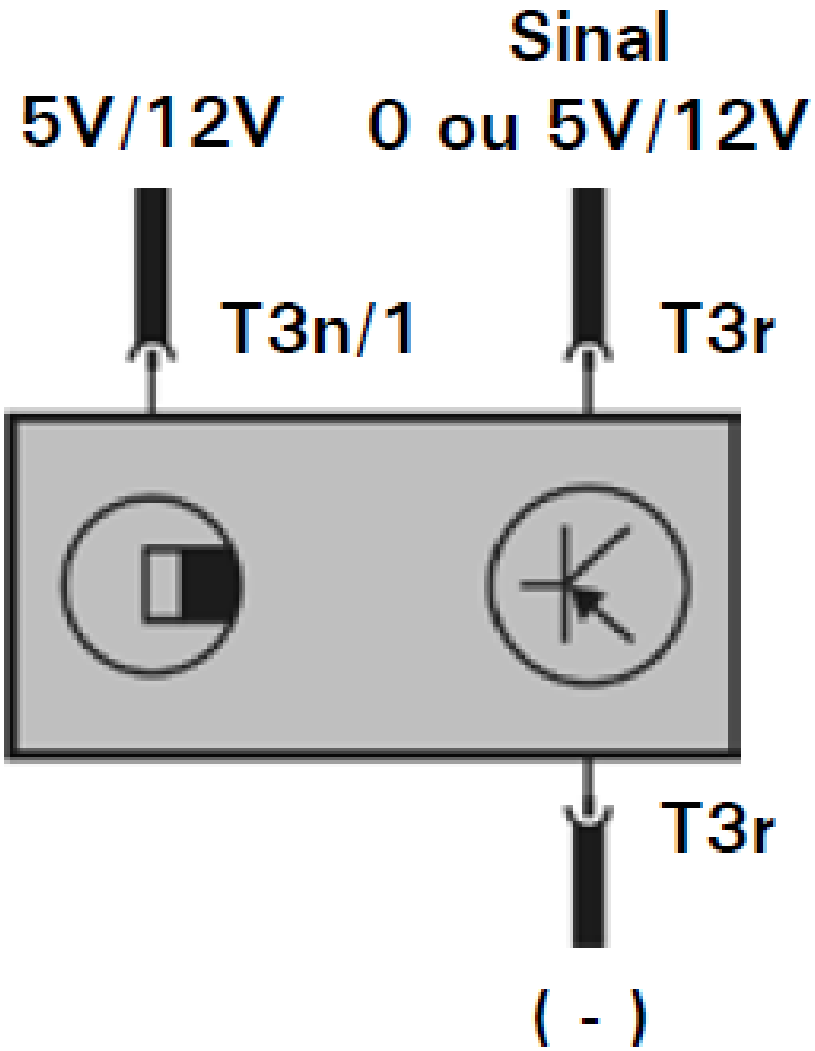
SENSOR DE FASE (Hall) – G 40




Sensor de fase G40
Início do dente


Final do 2º dente maior

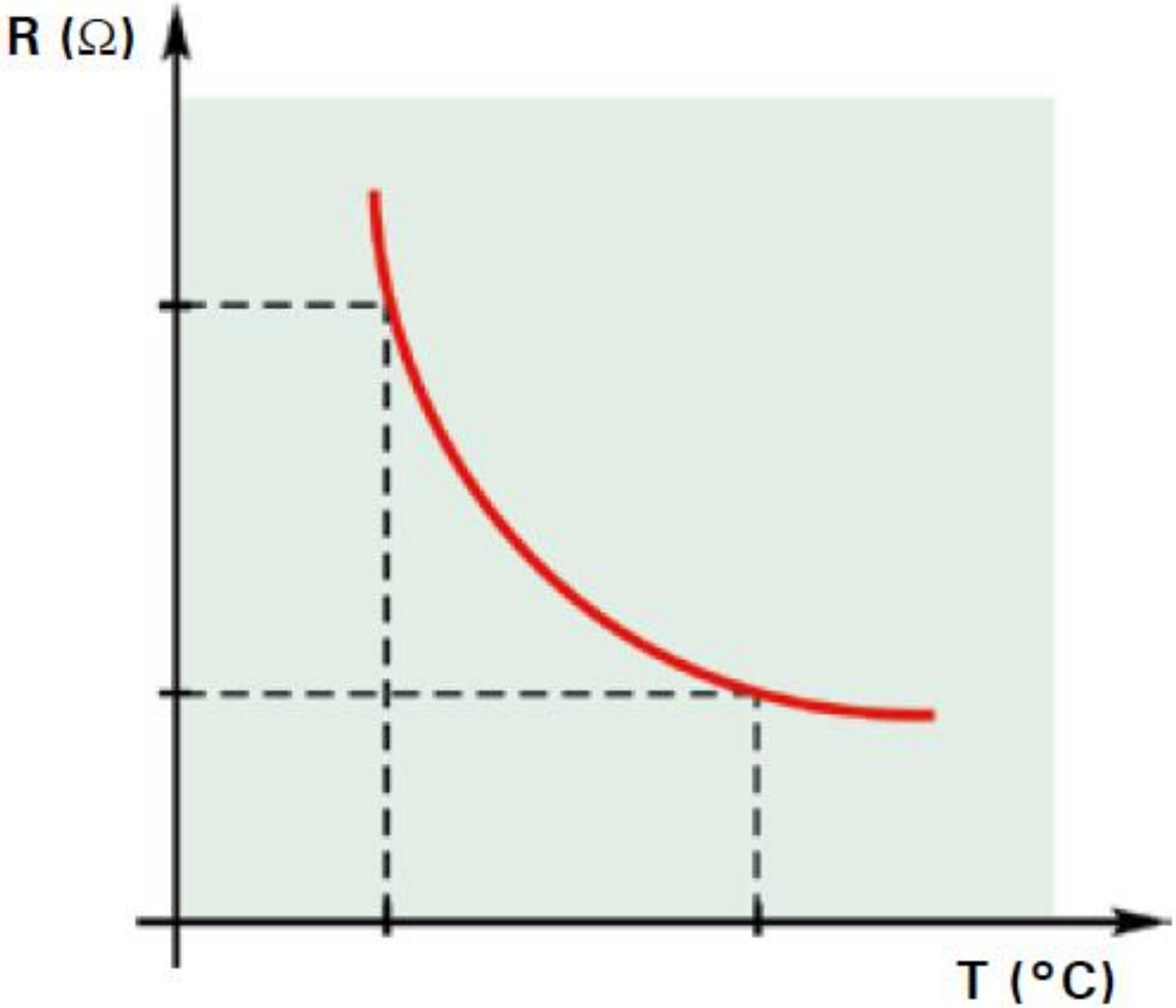
Simbologia do sensor no esquema elétrico



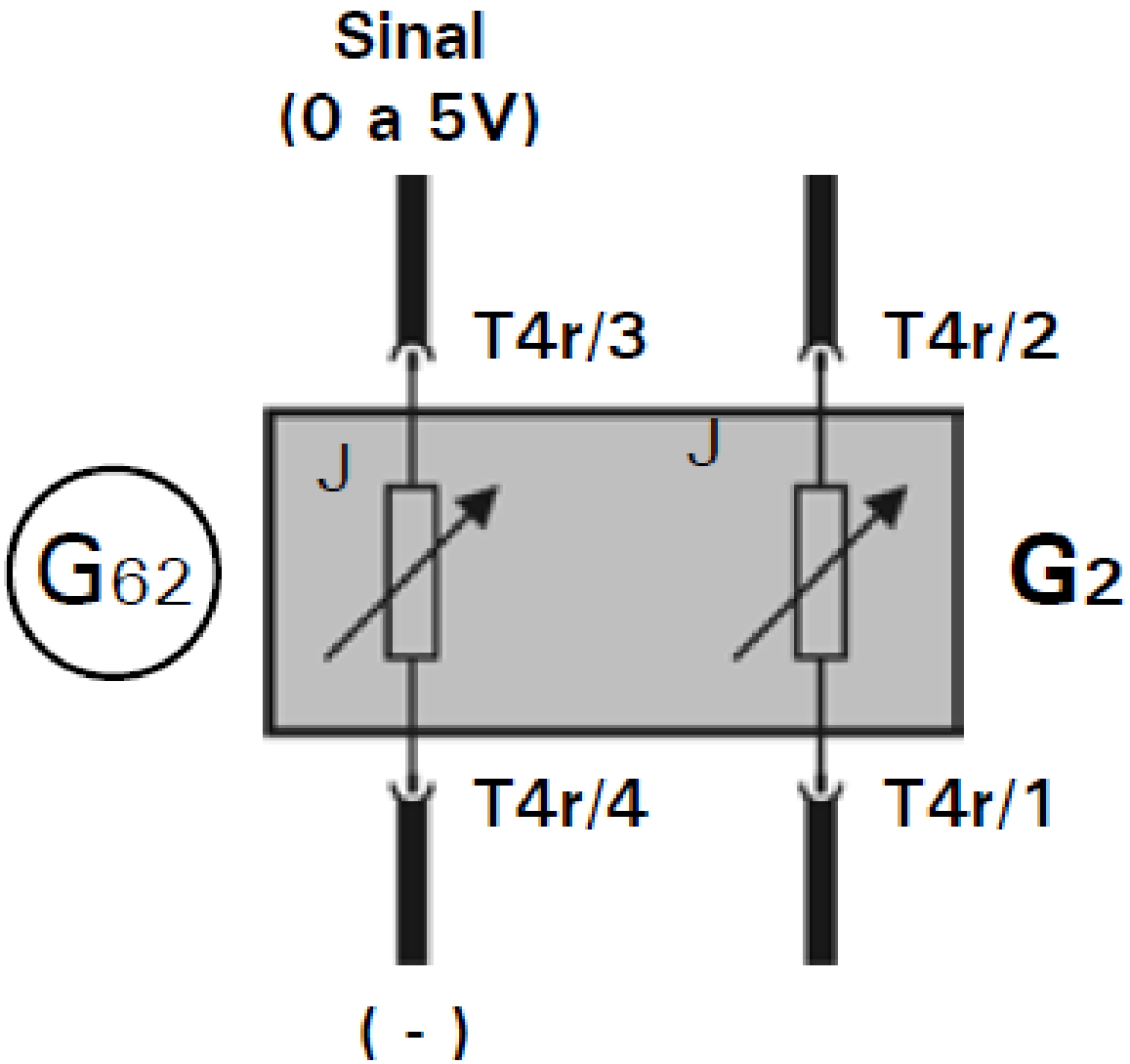
Sinal do G28
Sinal do G40
Metrologia
DSO
Modo Auto
5 V/Div.
10 ms/Div.
Amplitude canal A
0.125V
Amplitude canal B
13.125V
Valor temporal
-2.4 ms
Cursor 1
5 V/Div.
Cursor
Saltar para
Imprimir

SENSOR DE TEMPERATURA DO LÍQUIDO DE ARREFECIMENTO

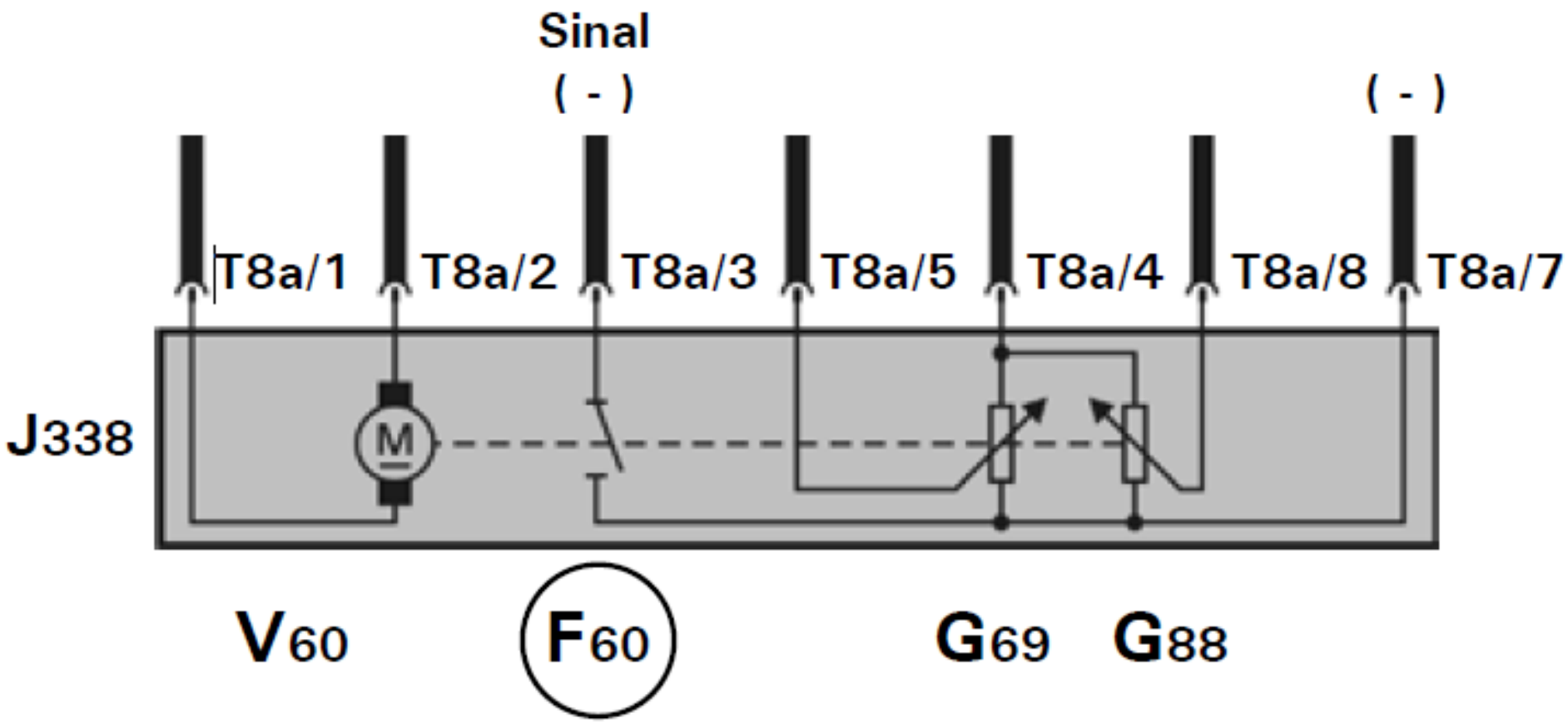
G 62


R (Ω)
T (°C)

Simbologia do sensor no esquema elétrico

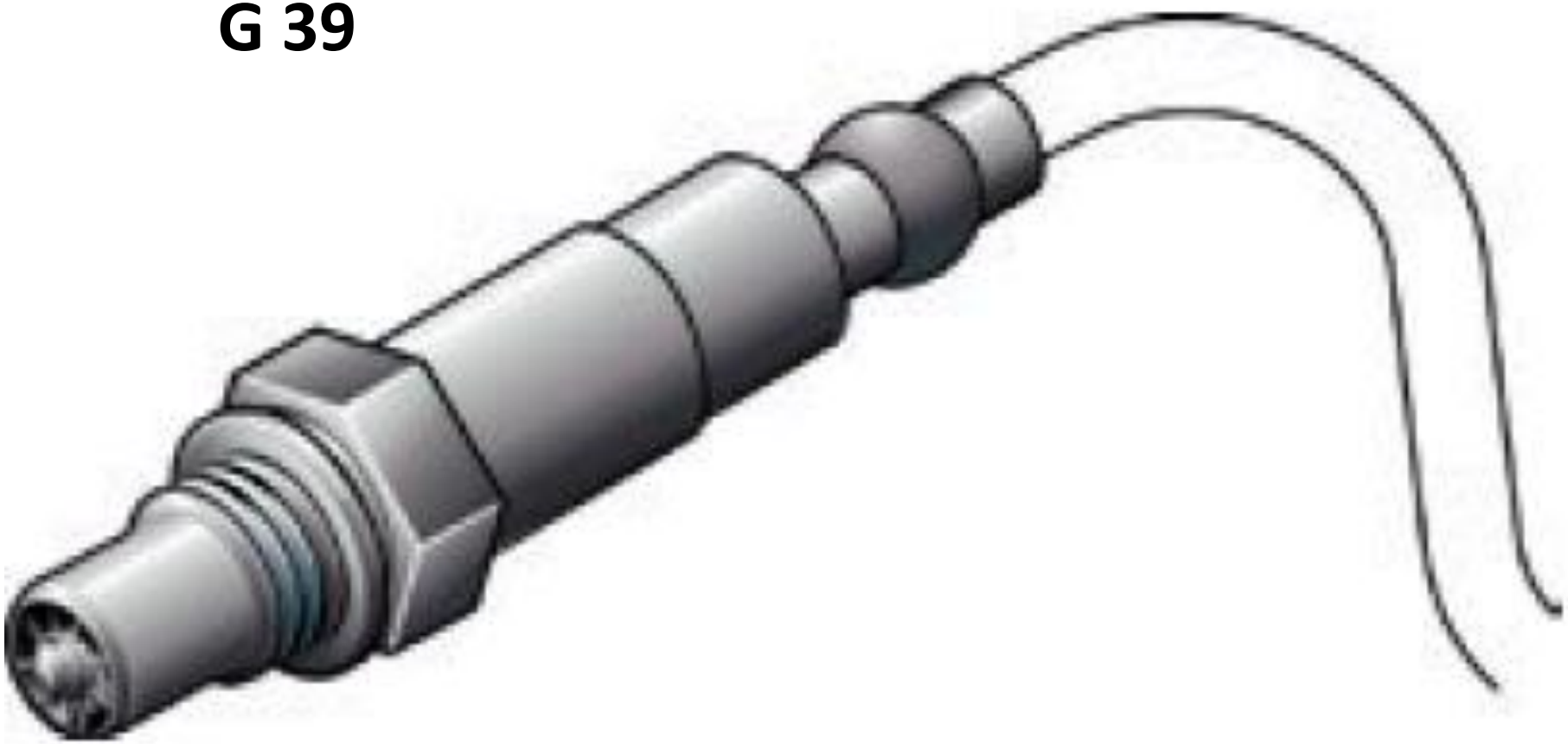


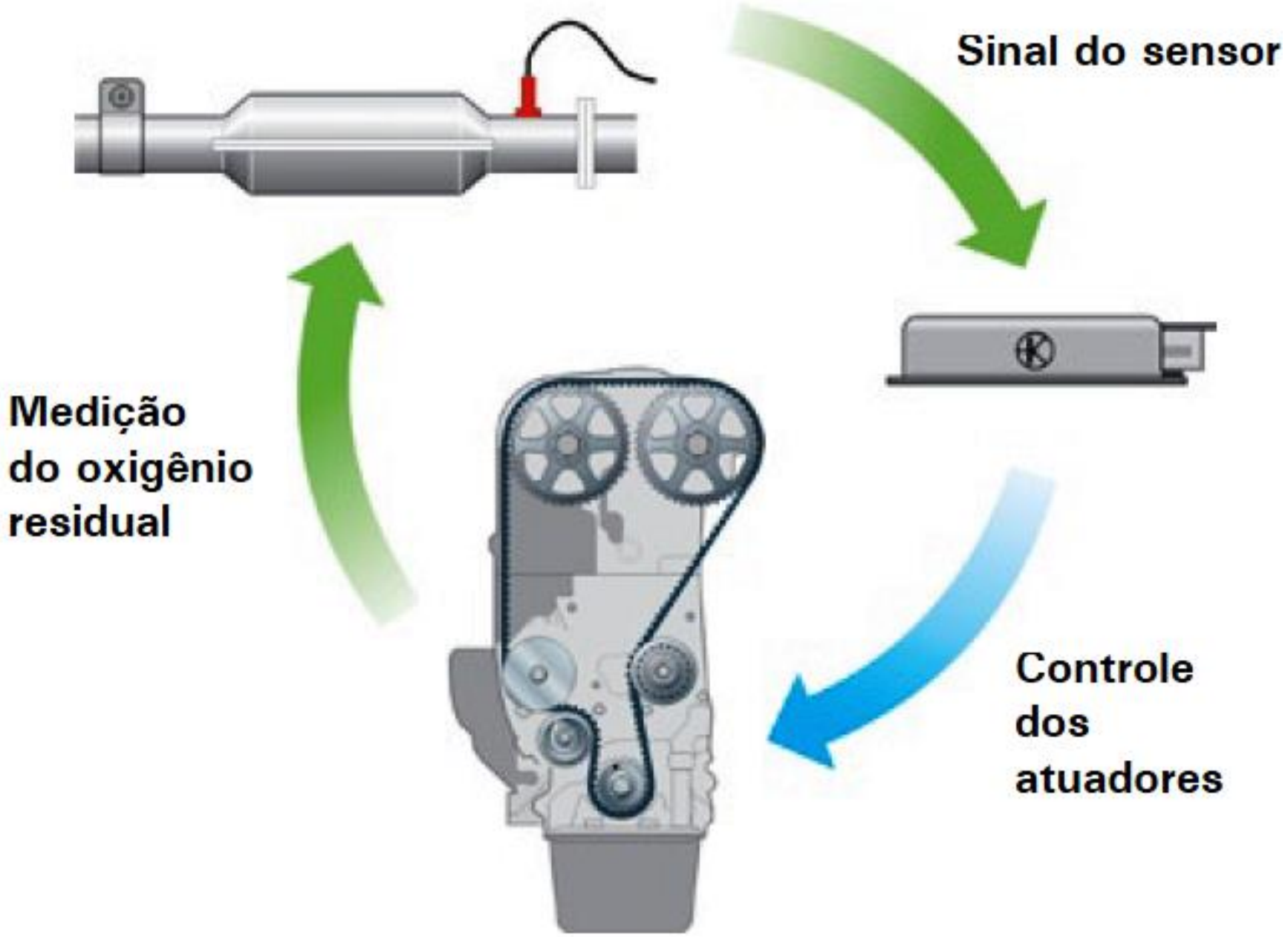
Simbologia do sensor no esquema elétrico



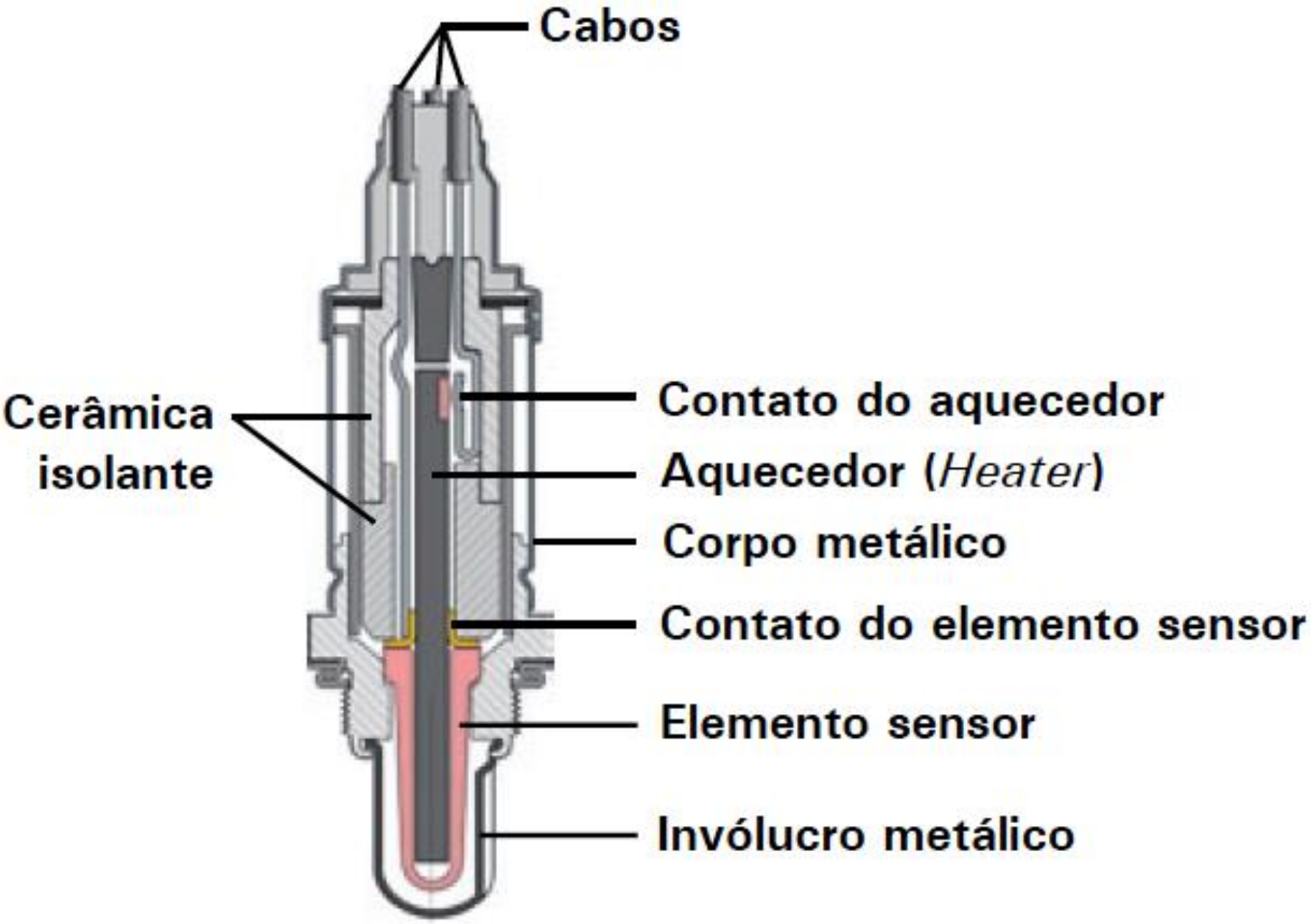
SENSOR DE OXIGÊNIO (Lambda)

G 39

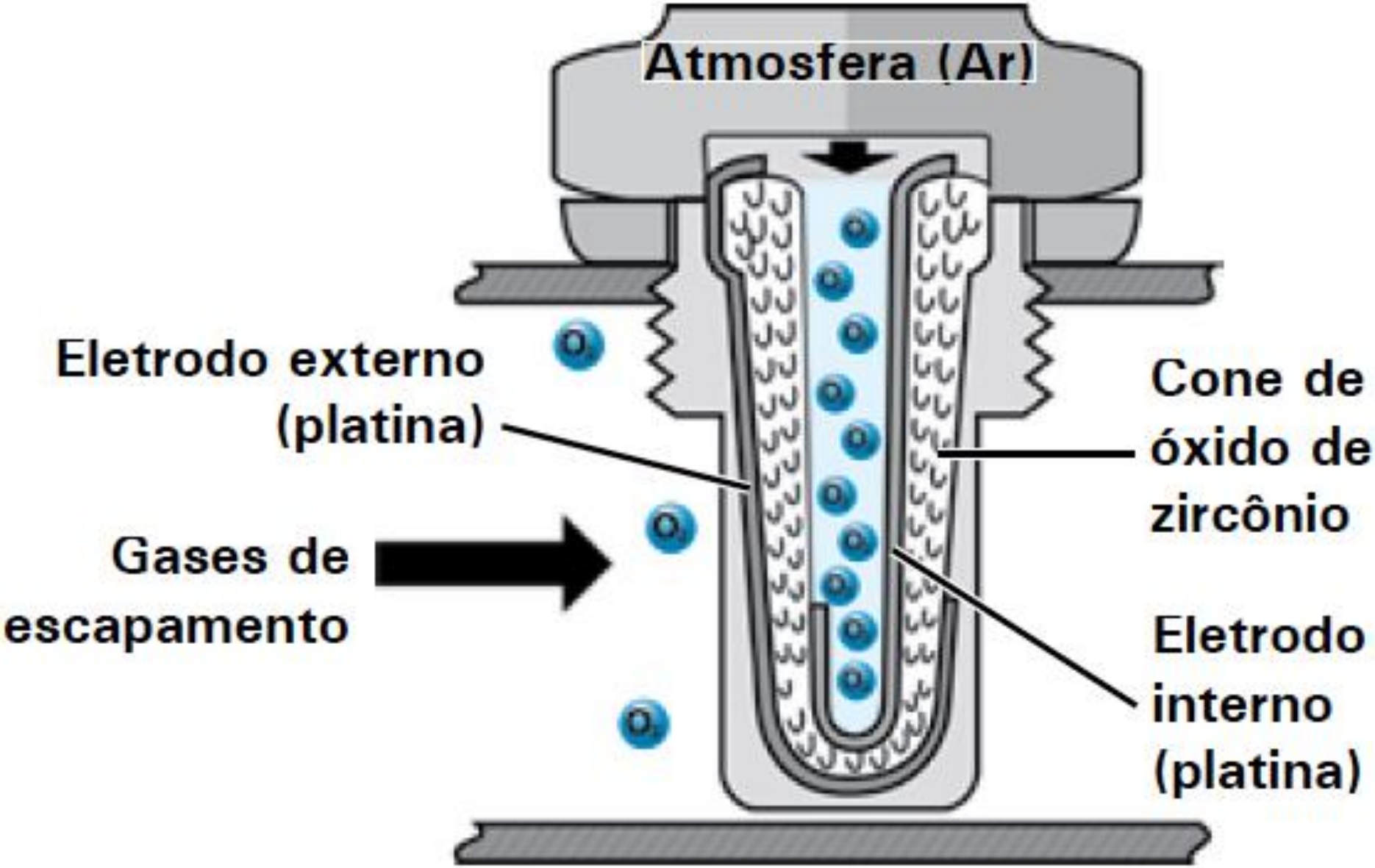


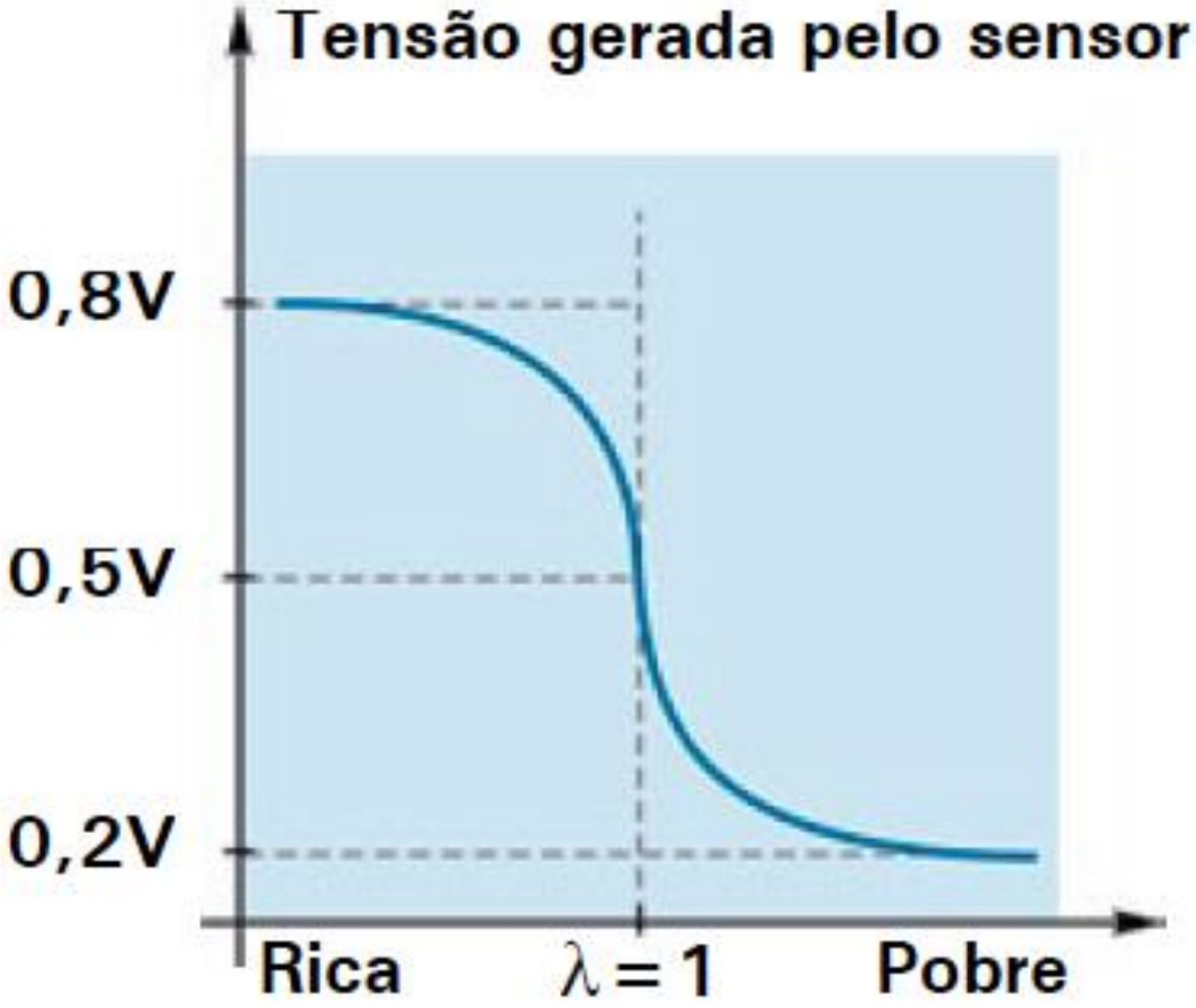

Sinal do sensor
Medição do oxigênio residual
Controle dos atuadores

CARACTERÍSTICAS CONSTRUTIVAS

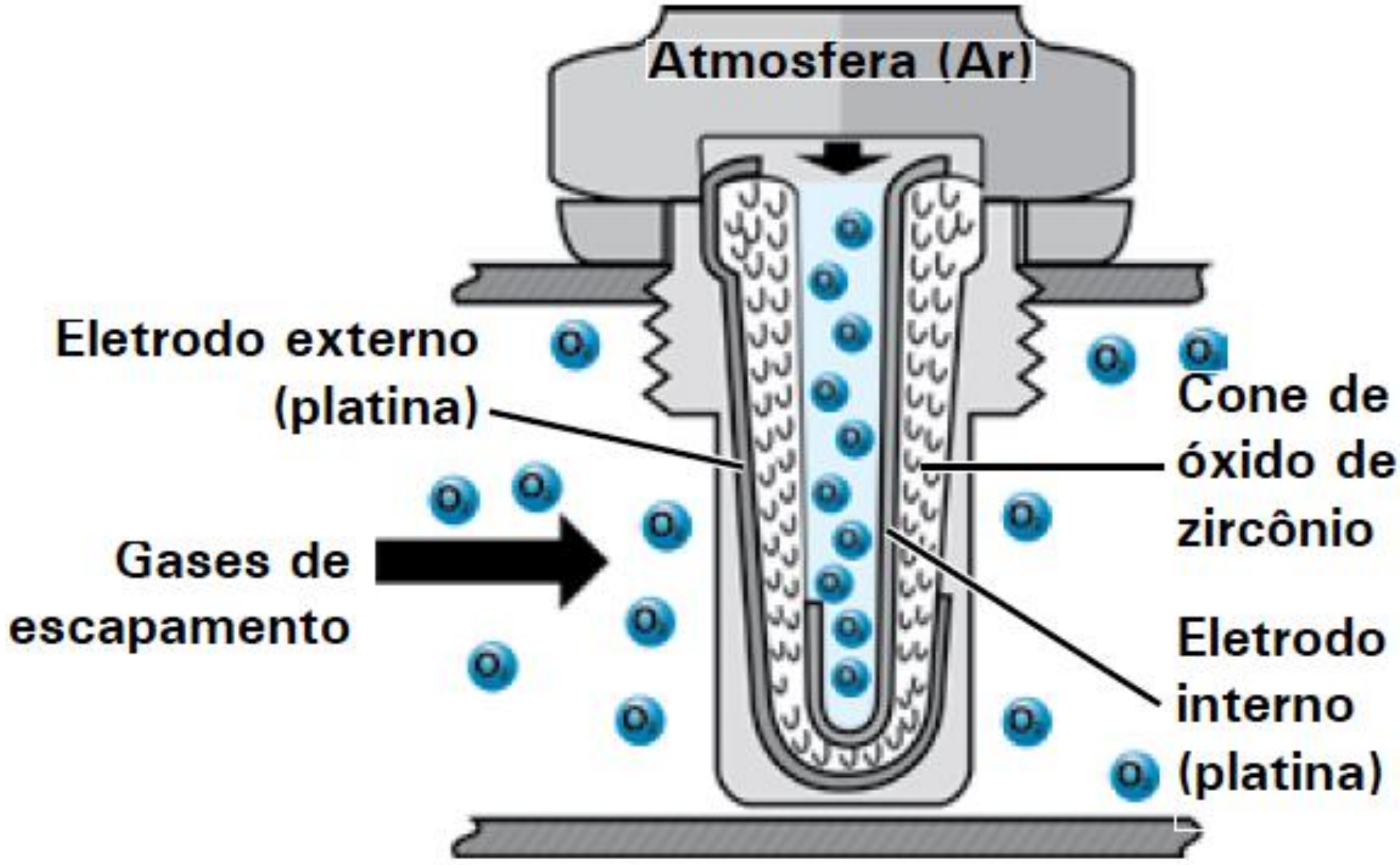


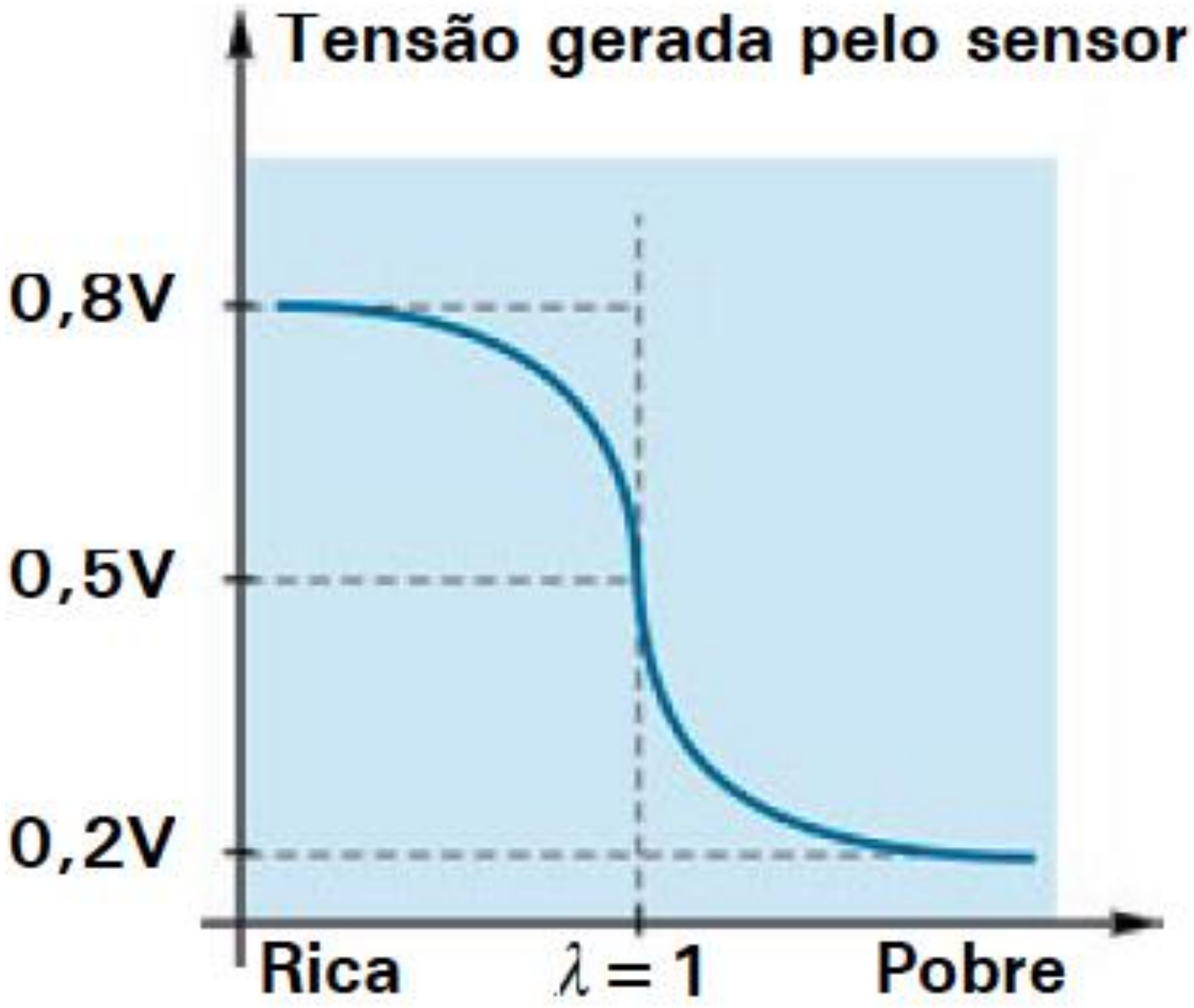
MISTURA RICA

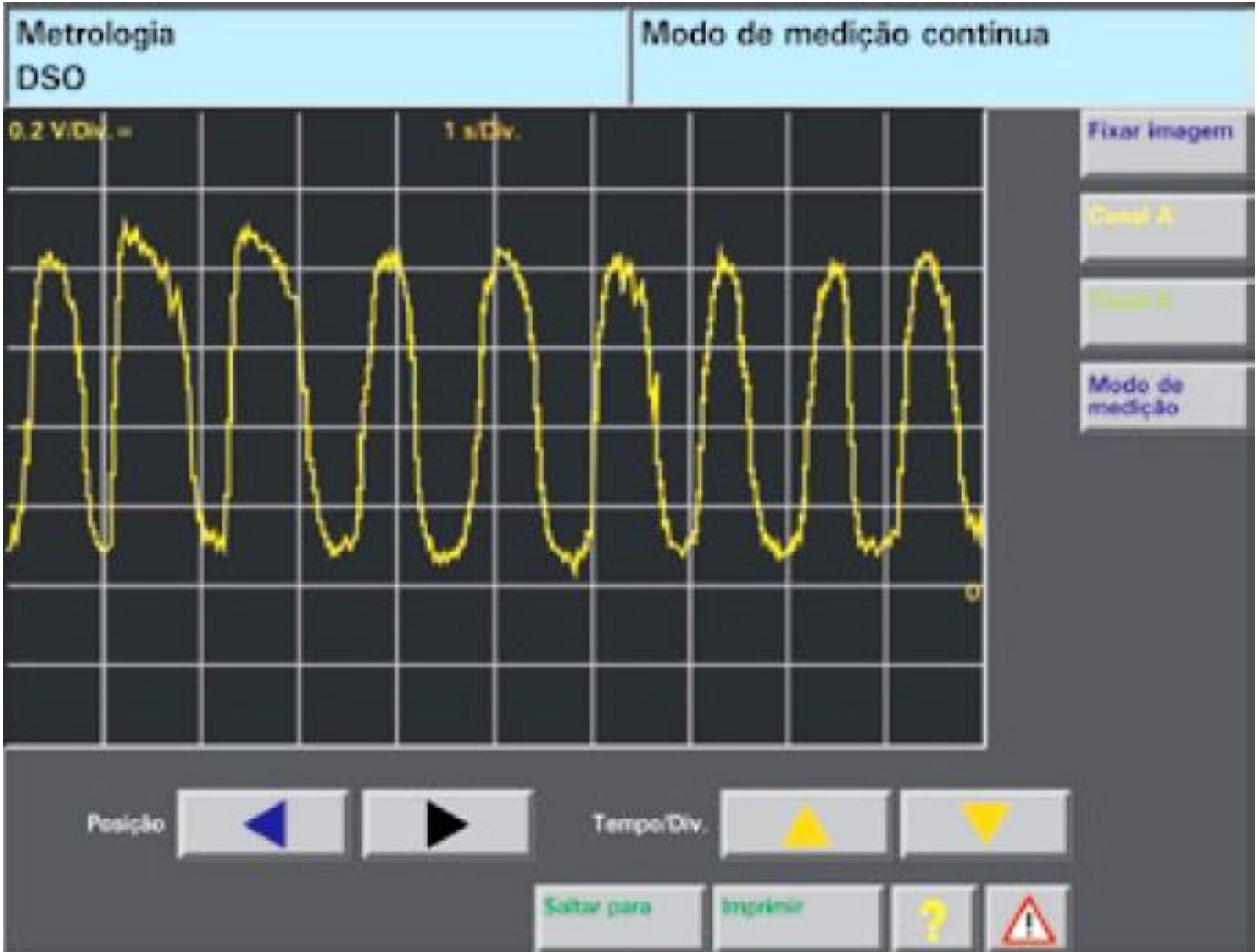



Tensão gerada pelo sensor
0,8V
0,5V
0,2V
Rica
λ = 1
Pobre

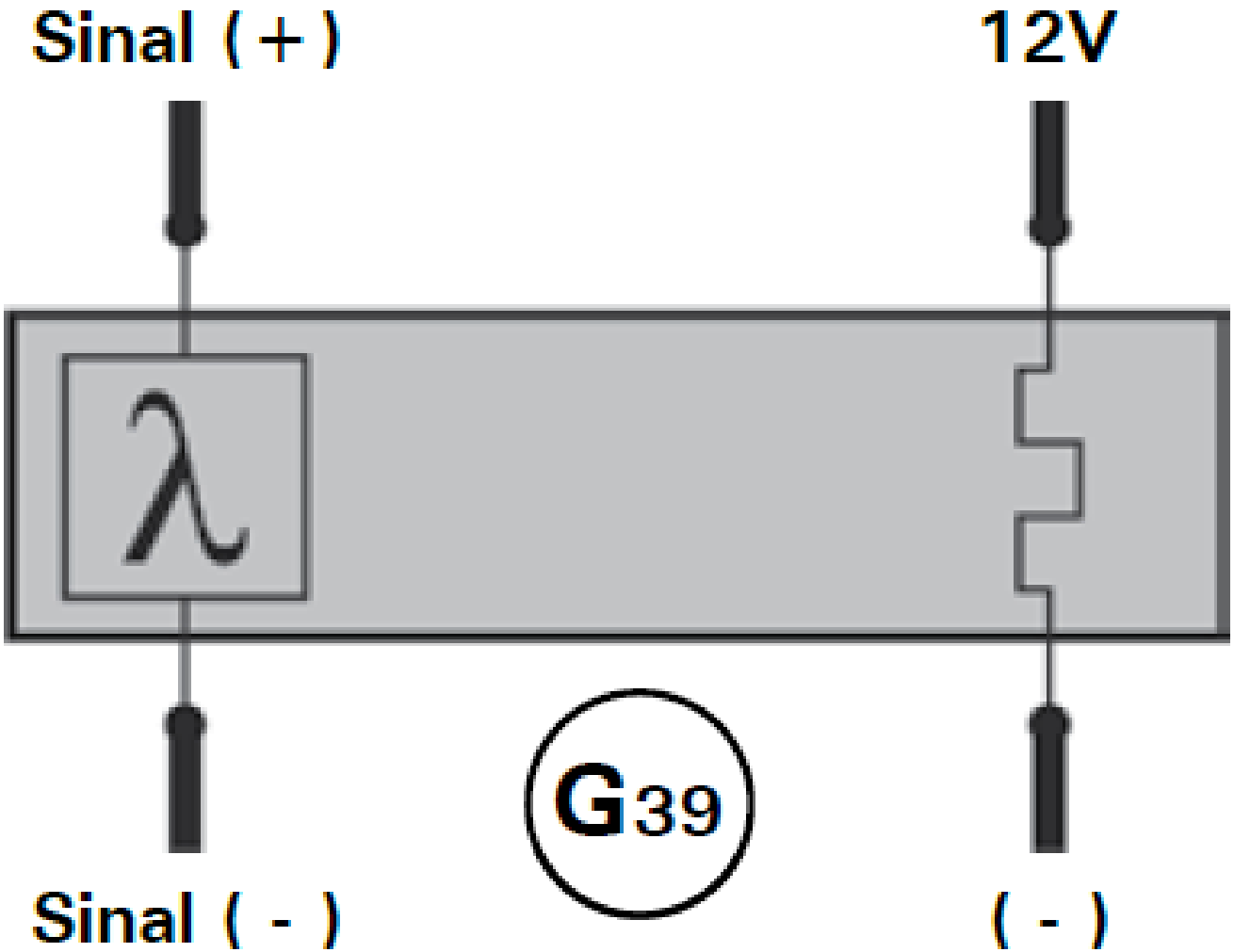
MISTURA POBRE



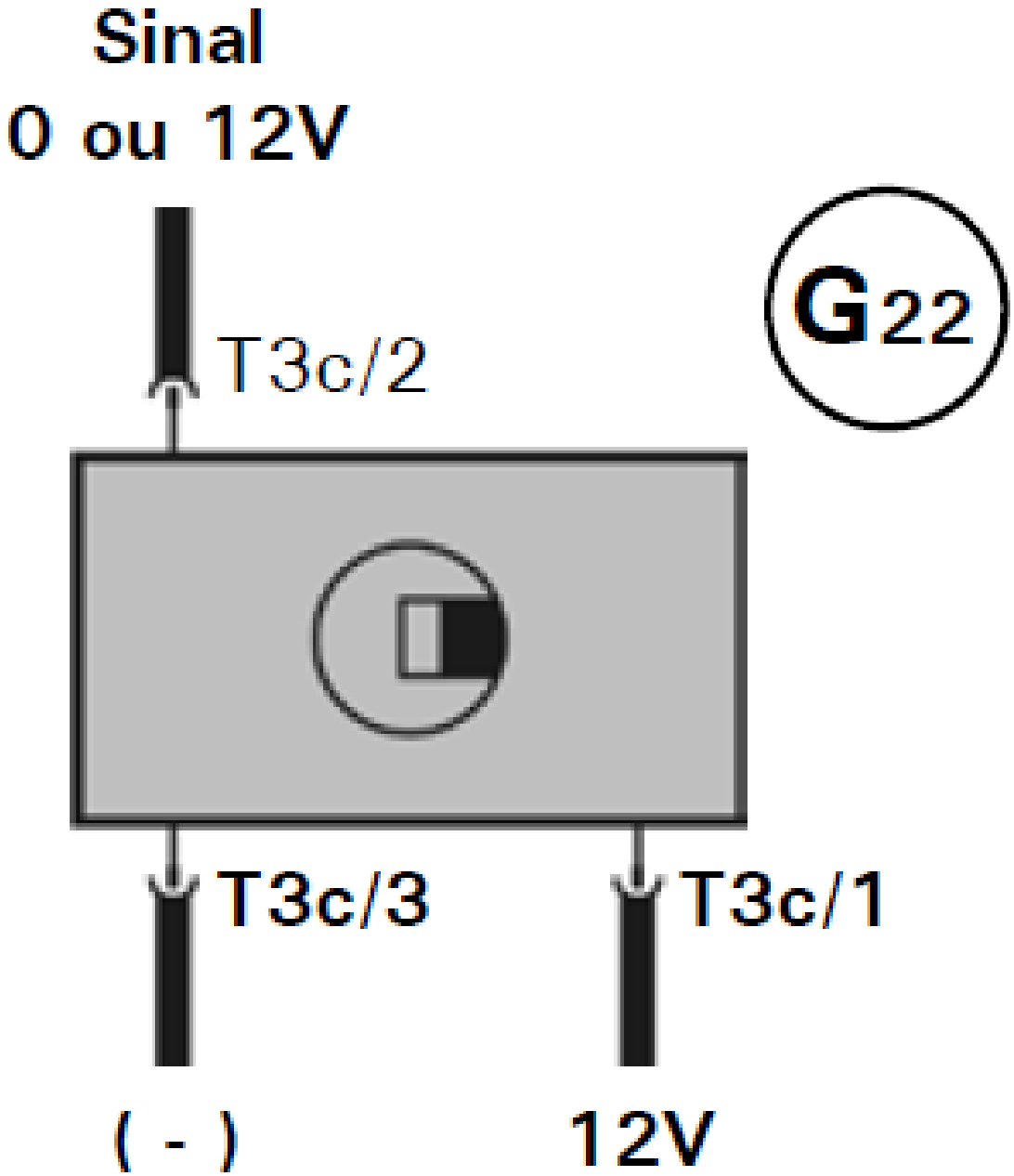

Tensão gerada pelo sensor
0,8V
0,5V
0,2V
Rica
λ = 1
Pobre


Metrologia
DSO
Modo de medição continua
0.2 V/Div. =
1 s/Div.
Fixar imagem
Canal A
Canal B
Modo de medição
Posição
Tempo/Div.
Saltar para
Imprimir

Simbologia do sensor no esquema elétrico



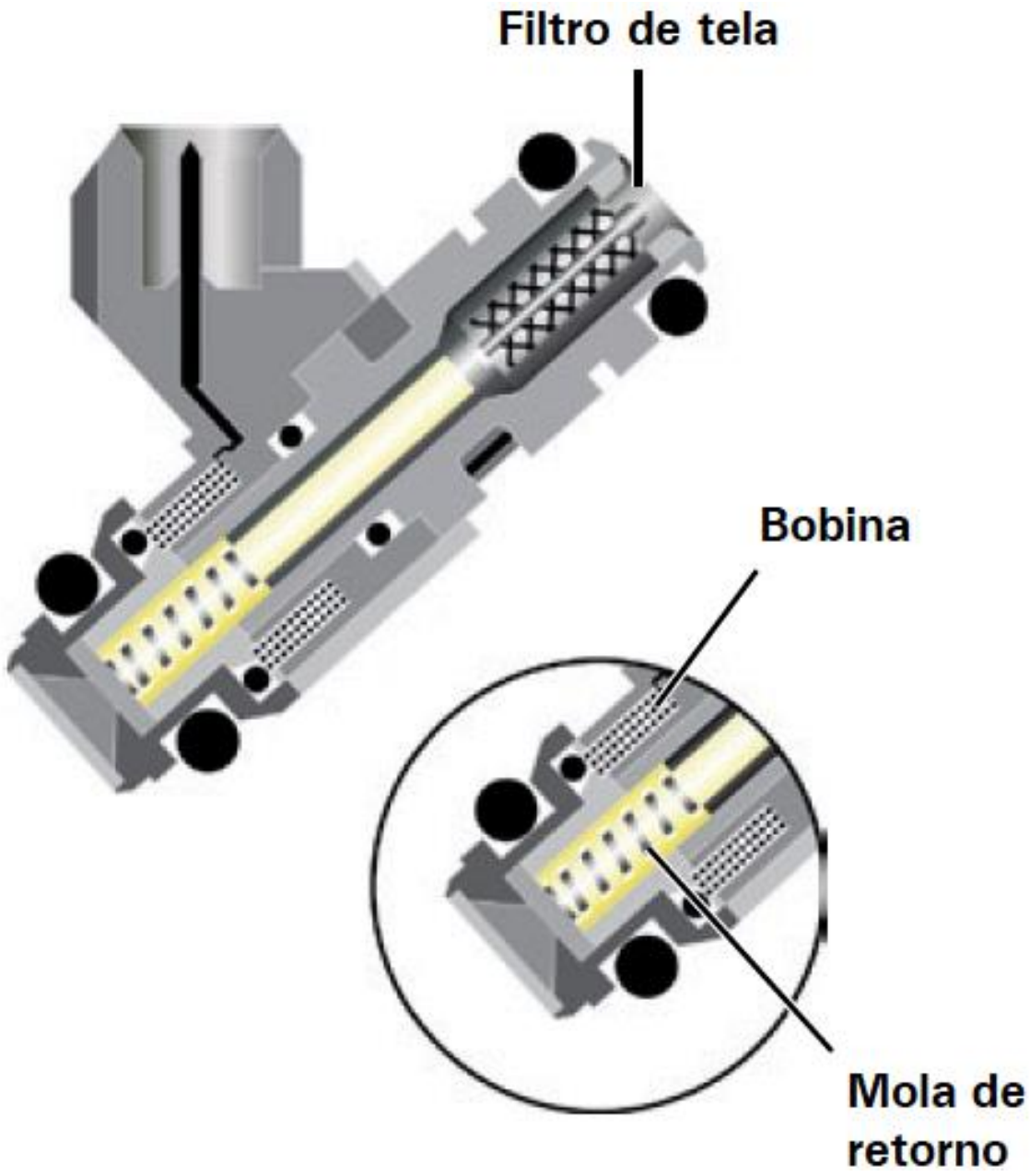
SENSOR DE VELOCIDADE - G 22

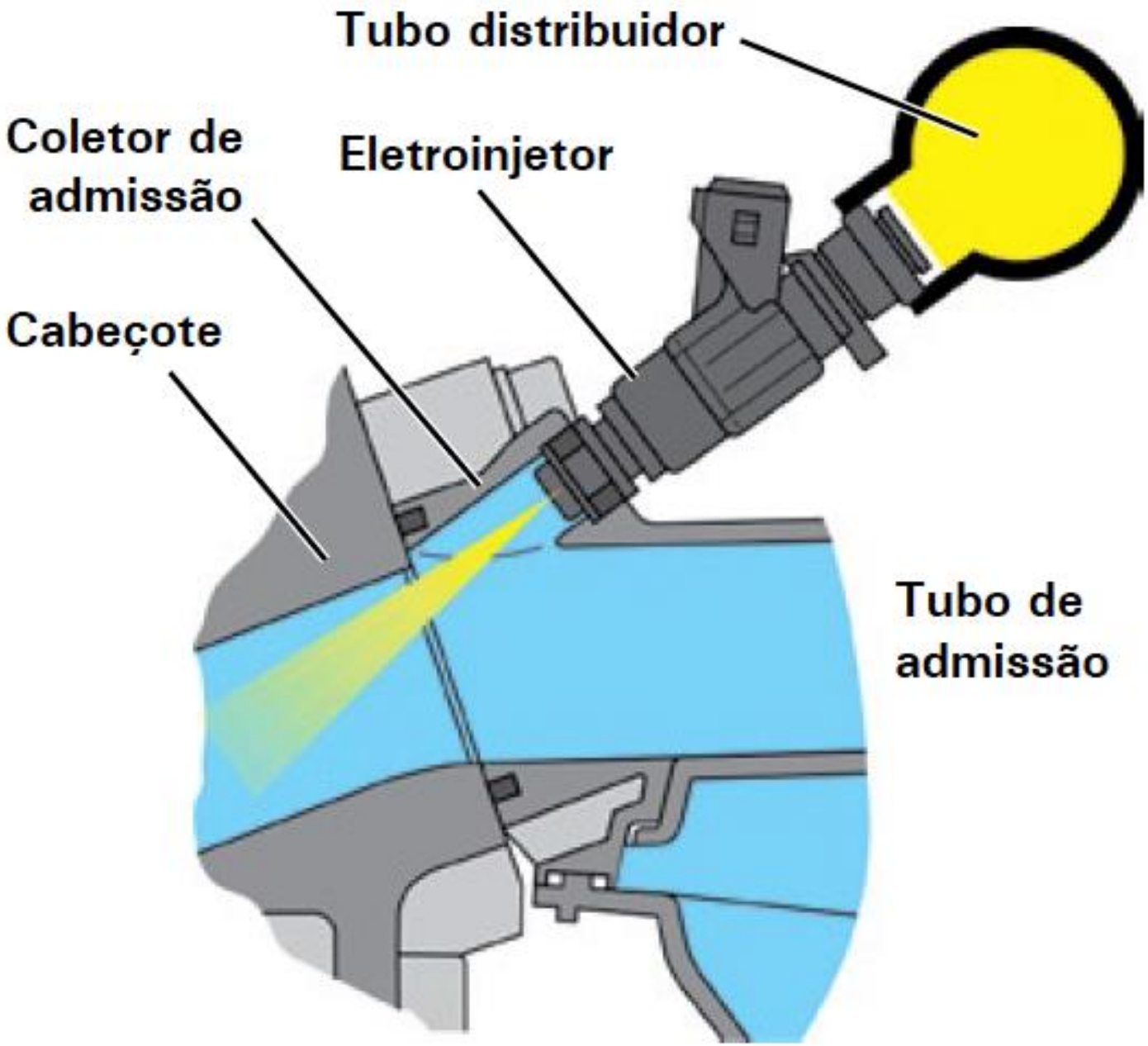

Sinal
0 ou 12V
T3c/2
G22
T3c/3
T3c/1
(-)
12V

UCM

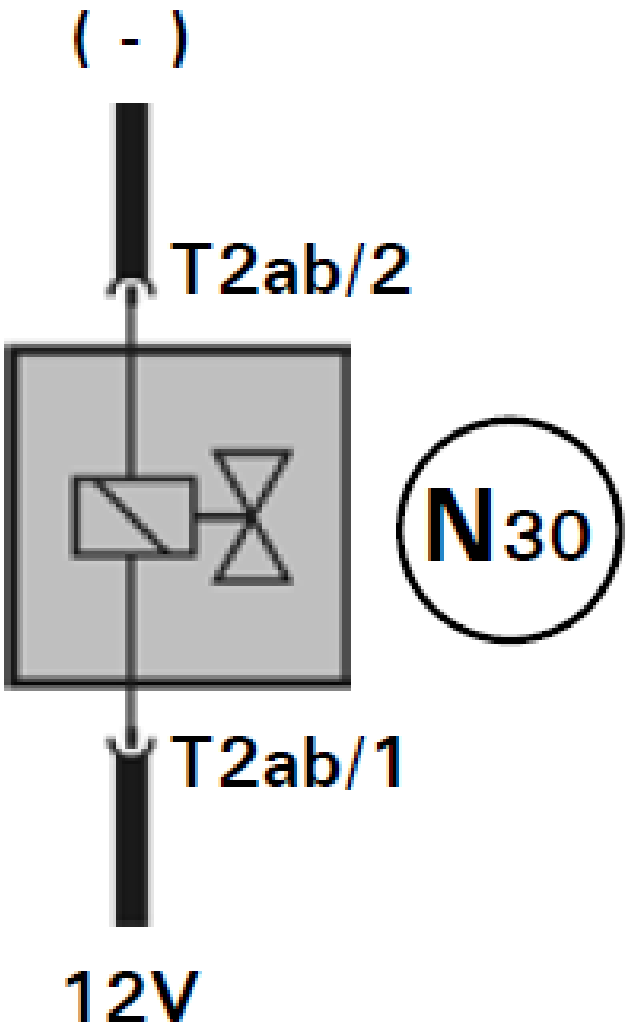
SINAIS DE SAÍDA

ELETRO INJETORES

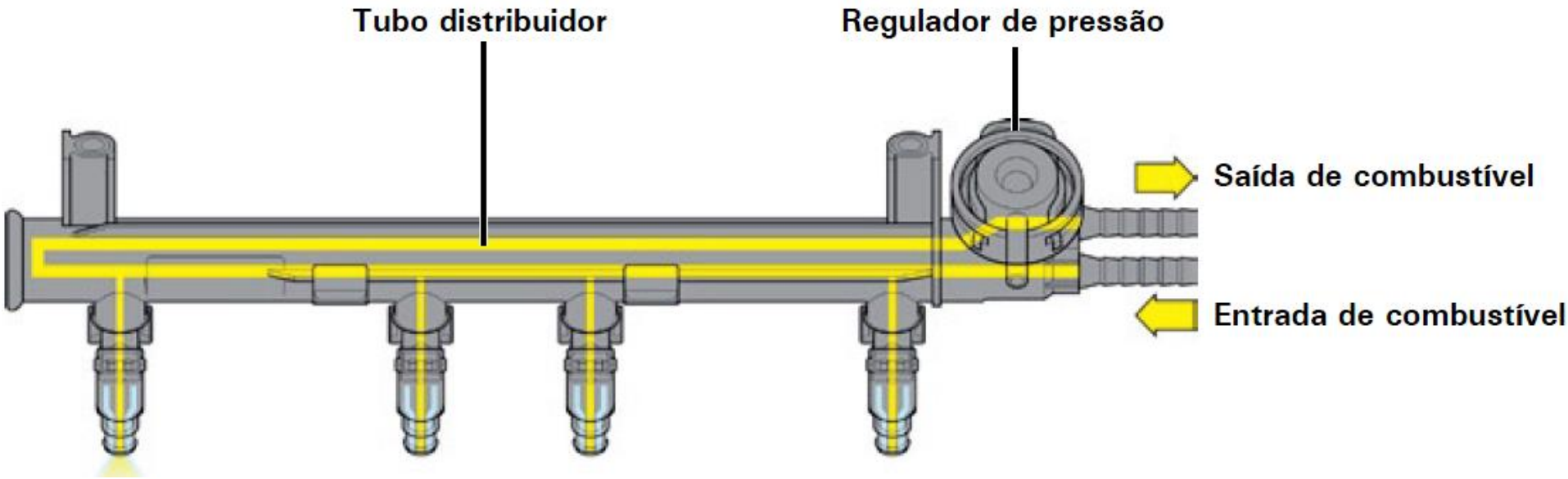



Tubo distribuidor
Coletor de admissão
Eletroinjetor
Cabeçote
Tubo de admissão

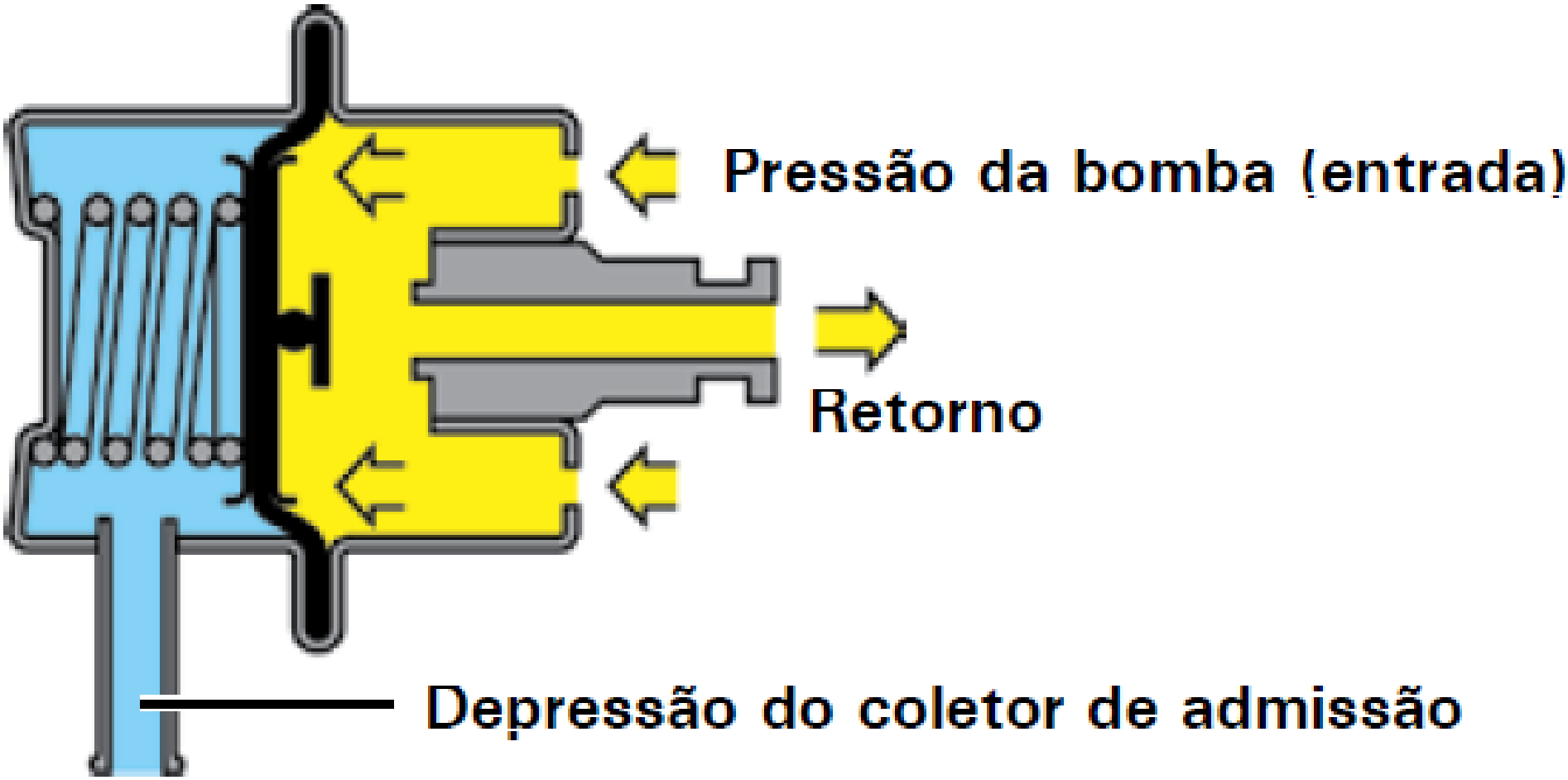
Simbologia do atuador no esquema elétrico

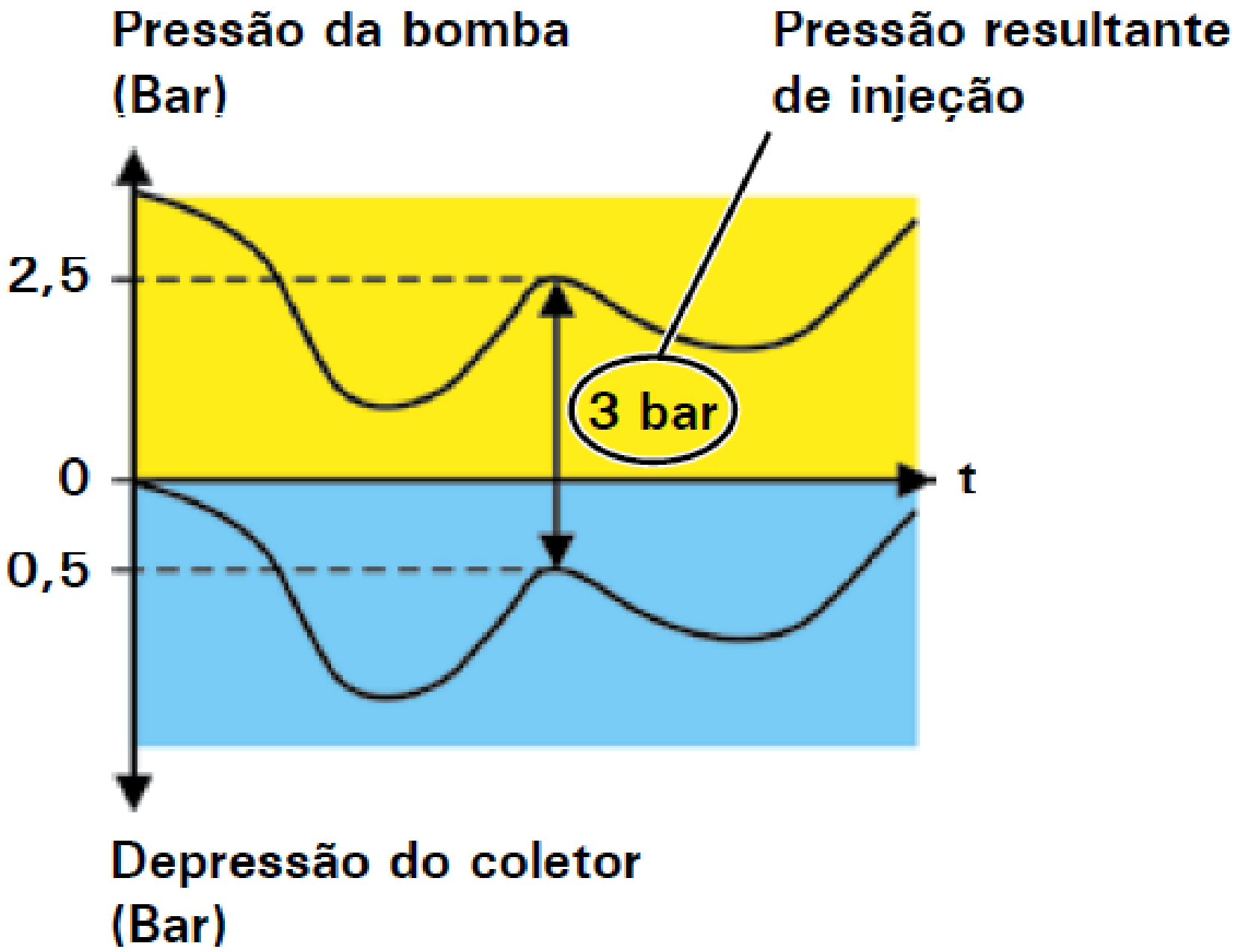


TUBO DISTRIBUIDOR

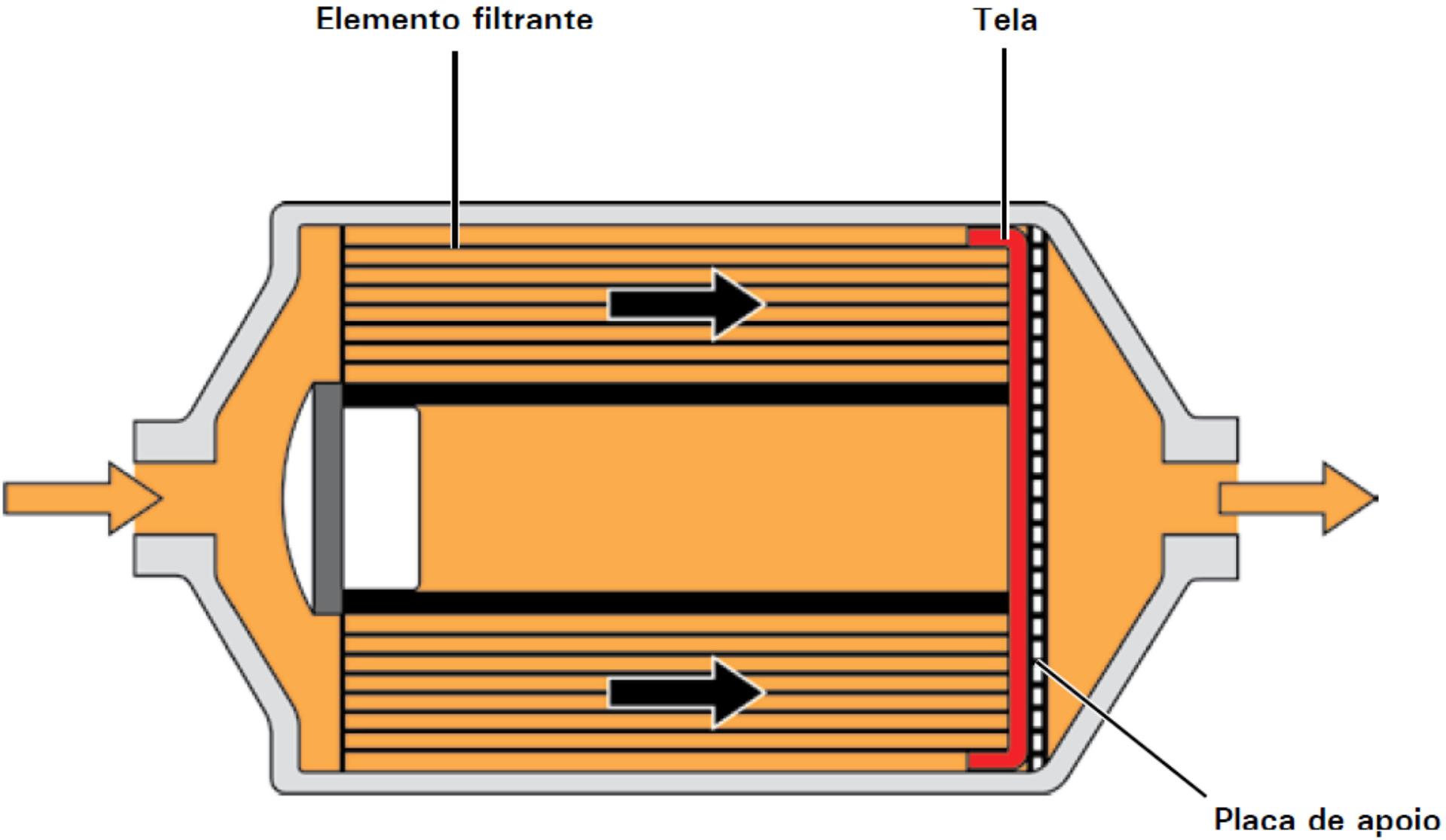


REGULADOR DE PRESSÃO

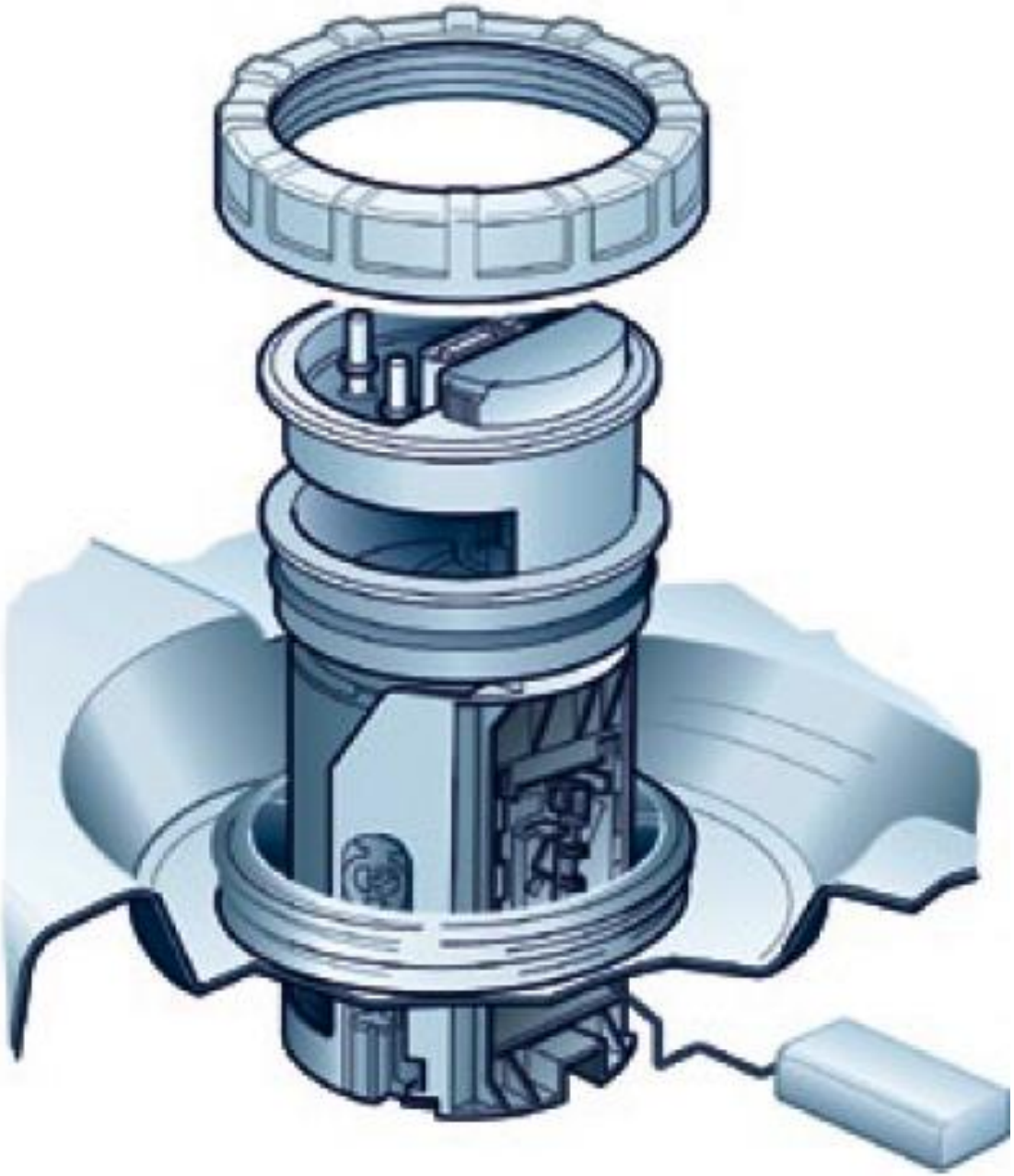


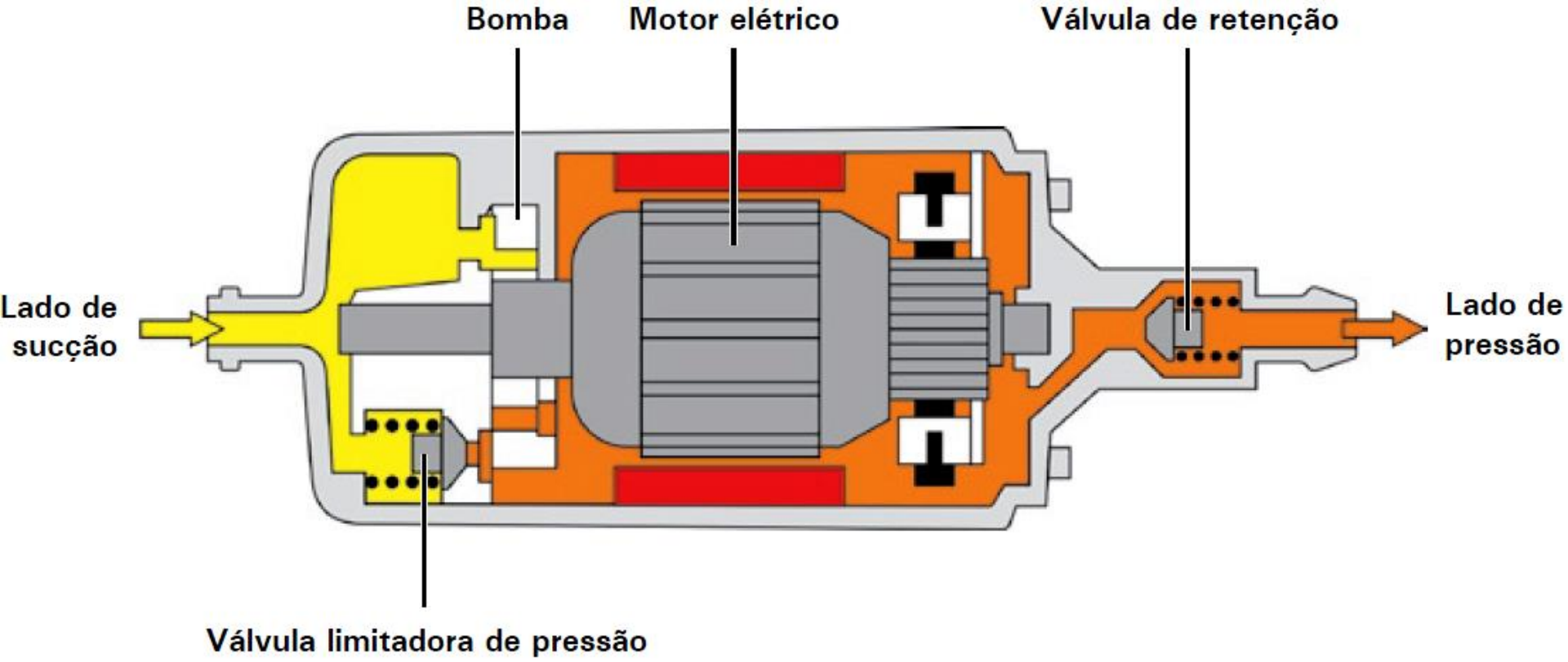

Pressão da bomba
(Bar)
Pressão resultante
de injeção
2,5
0
0,5
3 bar
t
Depressão do coletor
(Bar)

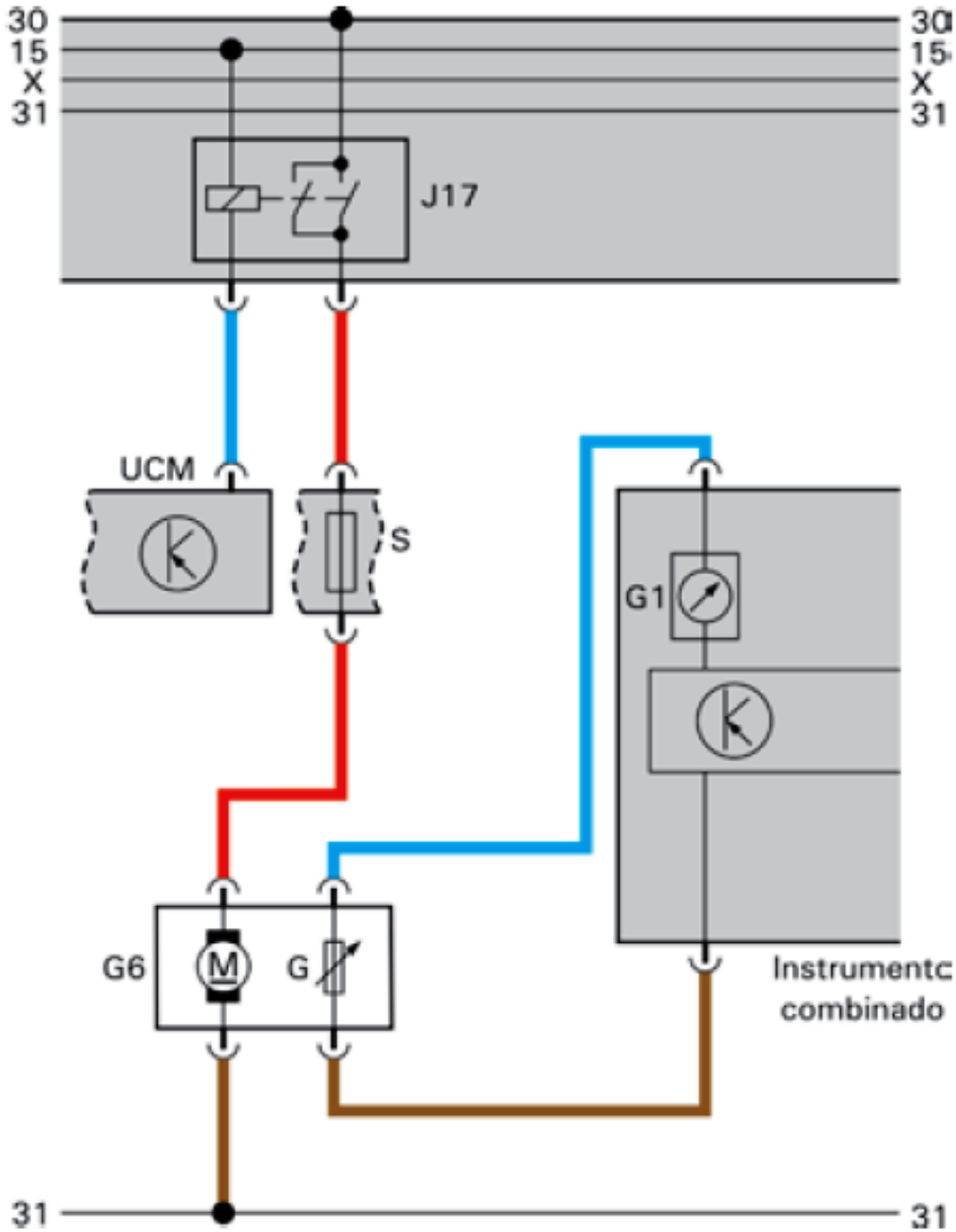
FILTRO DE COMBUSTÍVEL

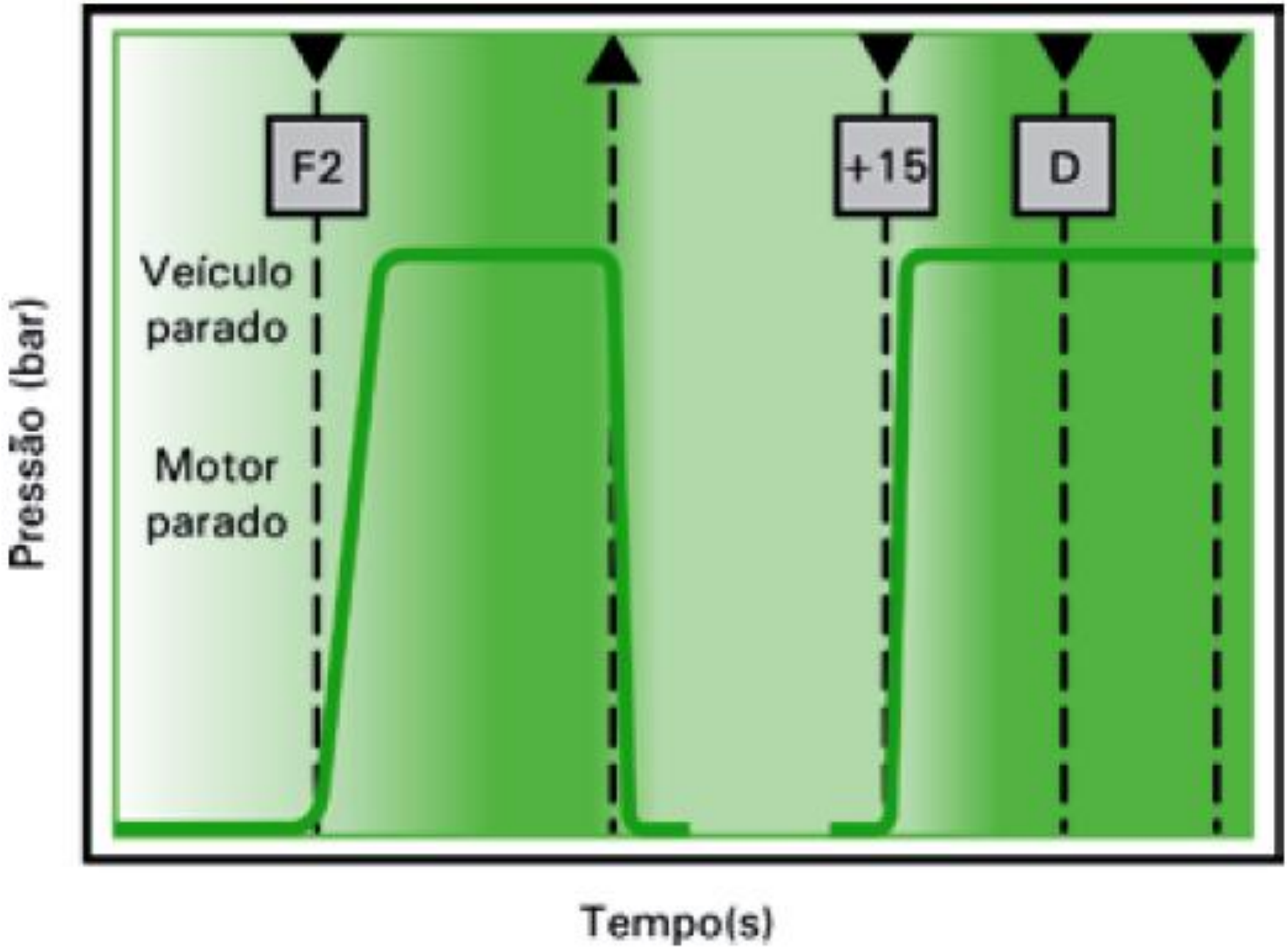


BOMBA DE COMBUSTÍVEL

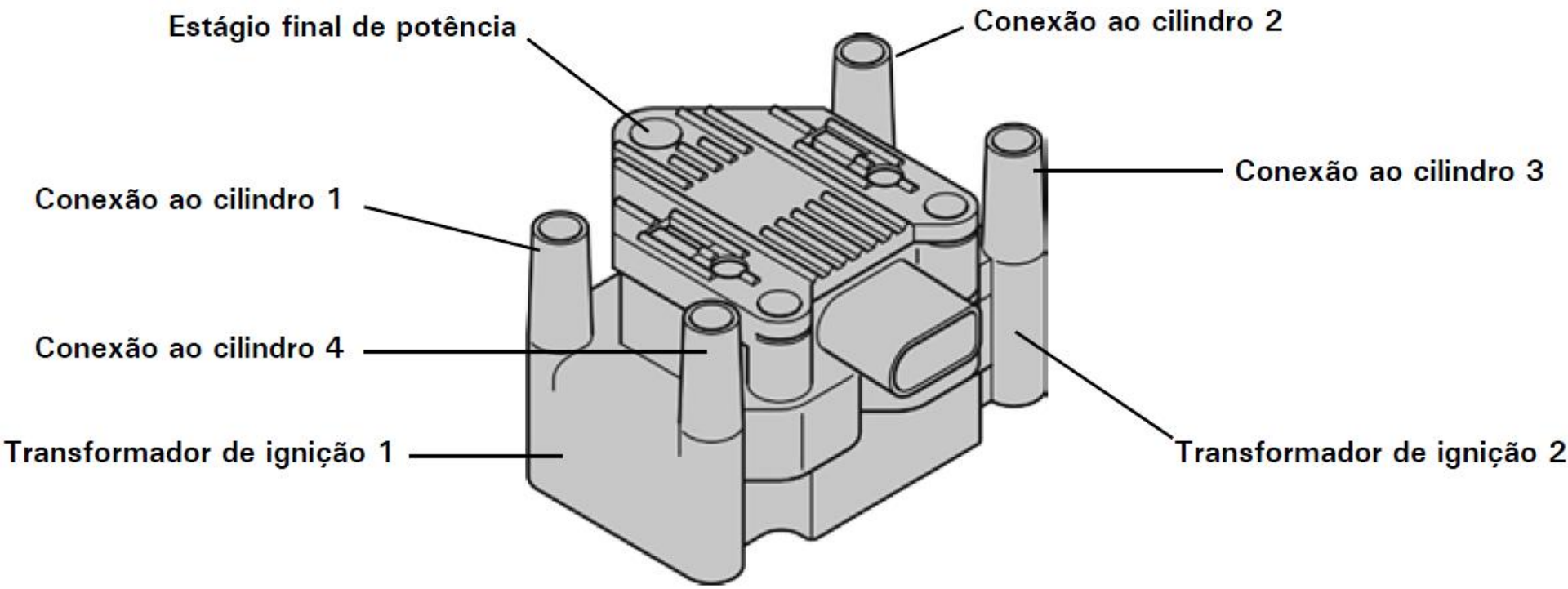



Bomba
Motor elétrico
Válvula de retenção
Lado de sucção
Lado de pressão
Válvula limitadora de pressão

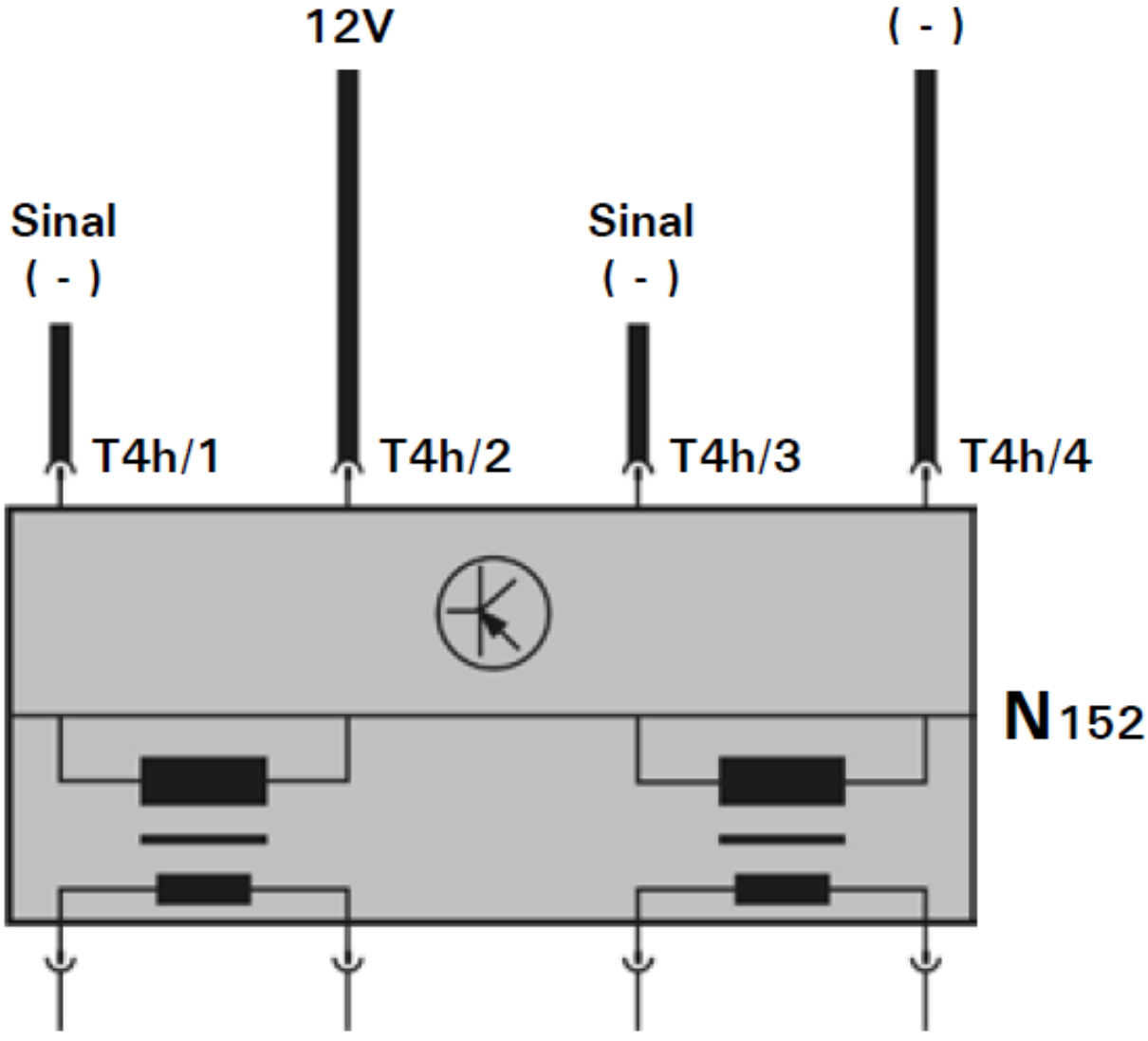

30
15
X
31
30
15
X
31
J17
UCM
S
G1
G6
M
G
Instrumentc
combinado
31
31


F2
+15
D
Veículo parado
Motor parado
Pressão (bar)
Tempo(s)

BOBINA DE IGNIÇÃO

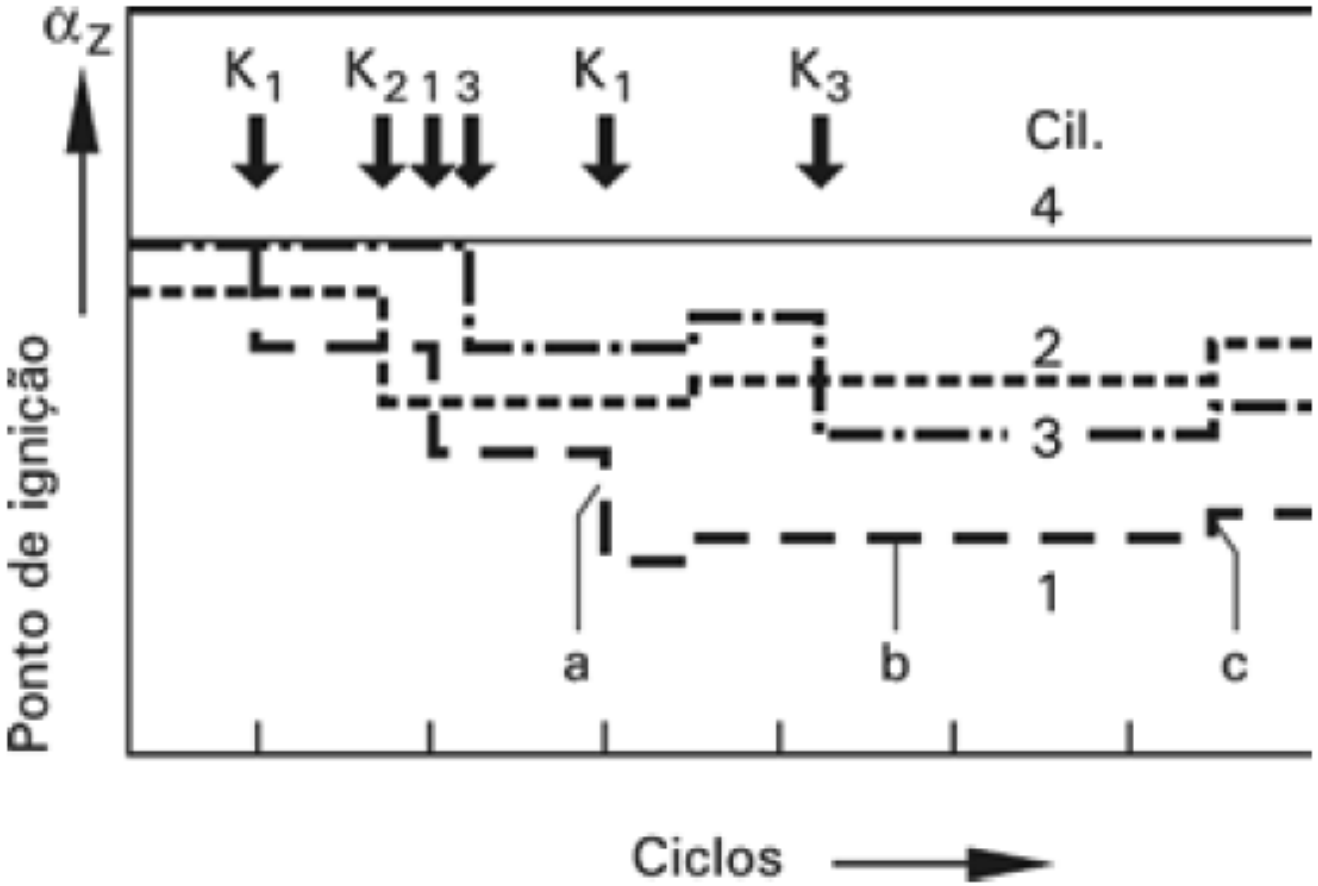


Simbologia do atuador no esquema elétrico



Velas de ignição

SENSOR DE DETONAÇÃO



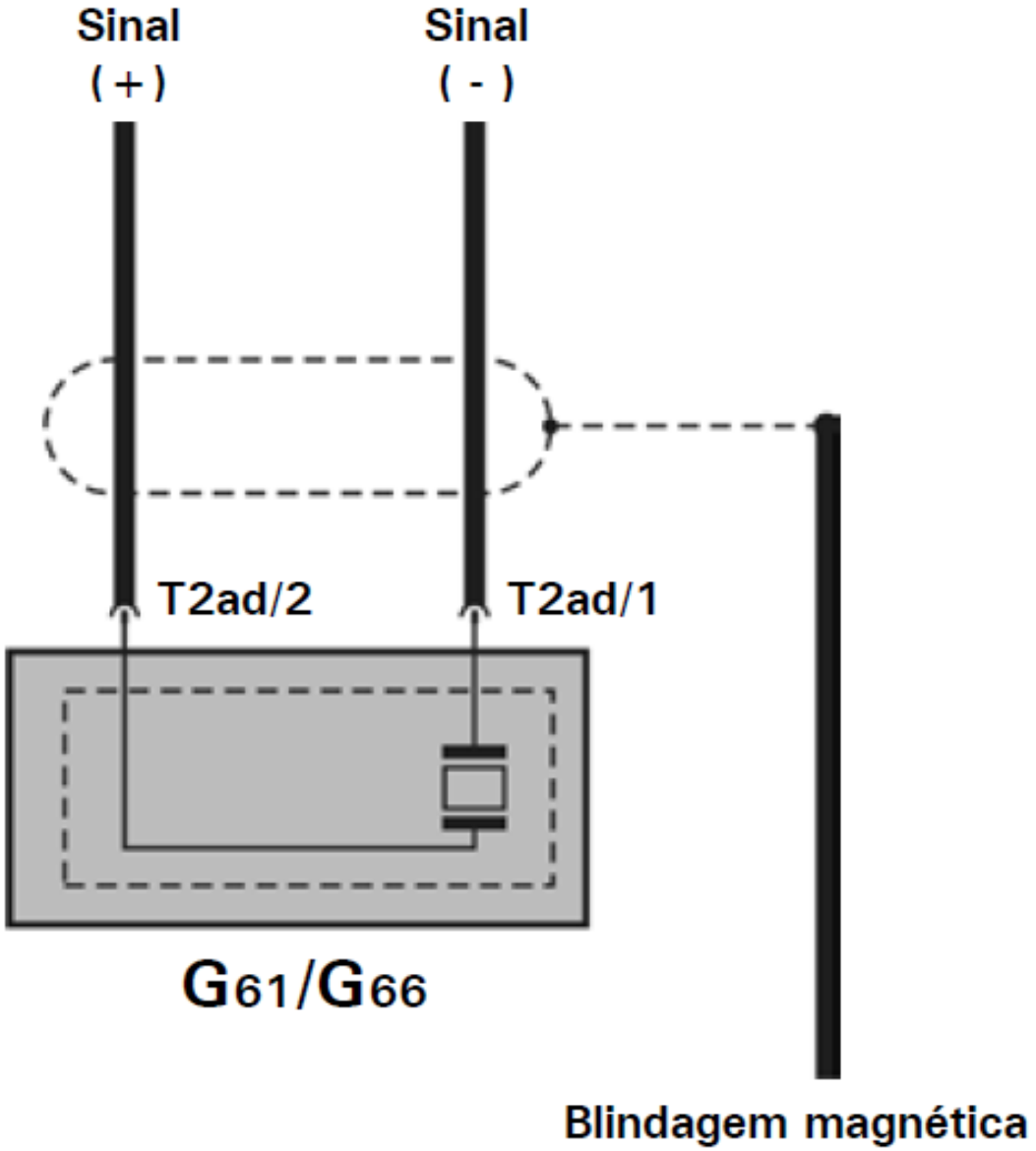
$K_{1...3}$ = Detonação nos cilindros 1 a 3 (Cilindro 4 sem detonação)

a = Retardo do ponto de ignição

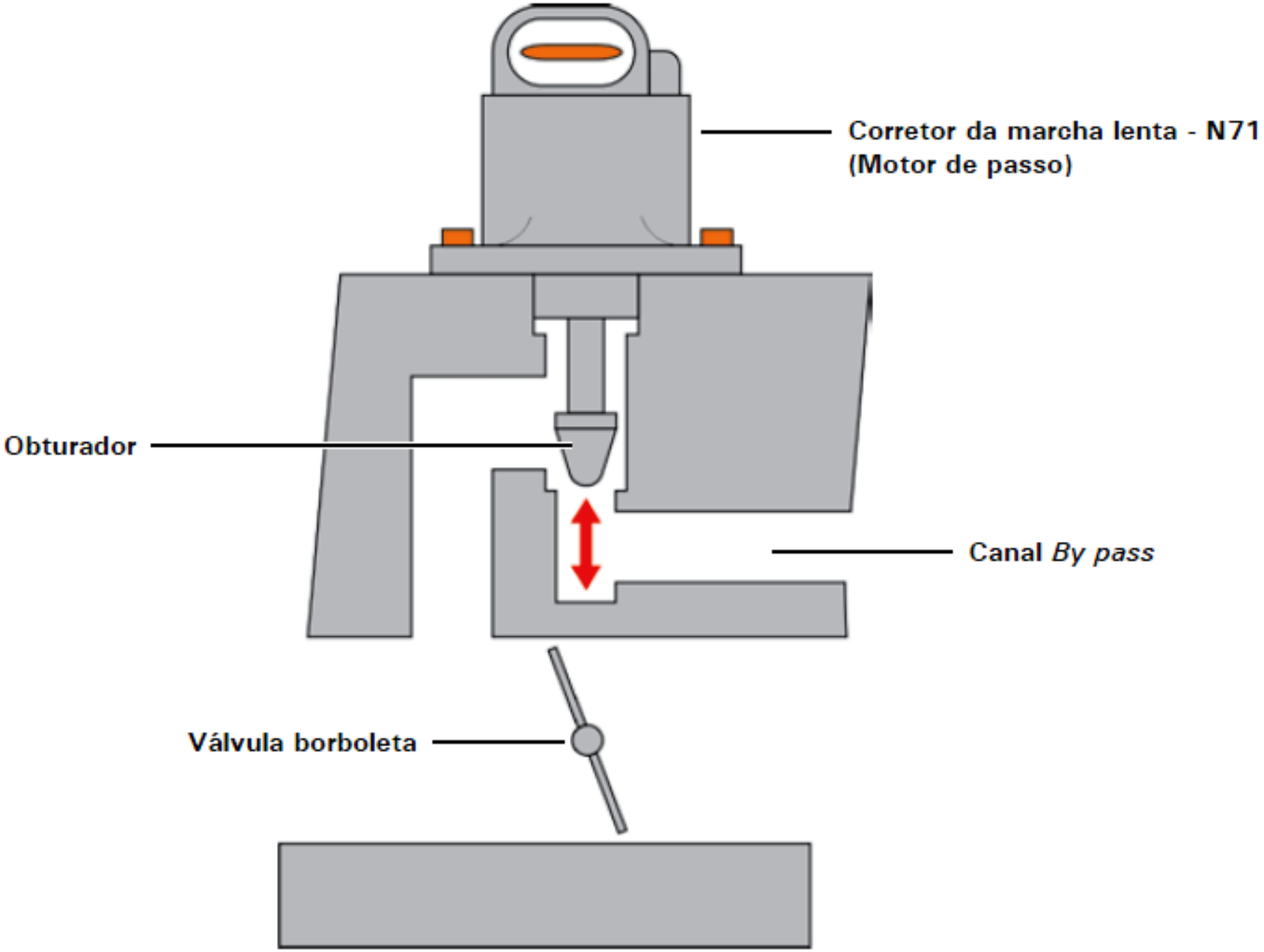
b = Recuperação parcial do ponto de ignição

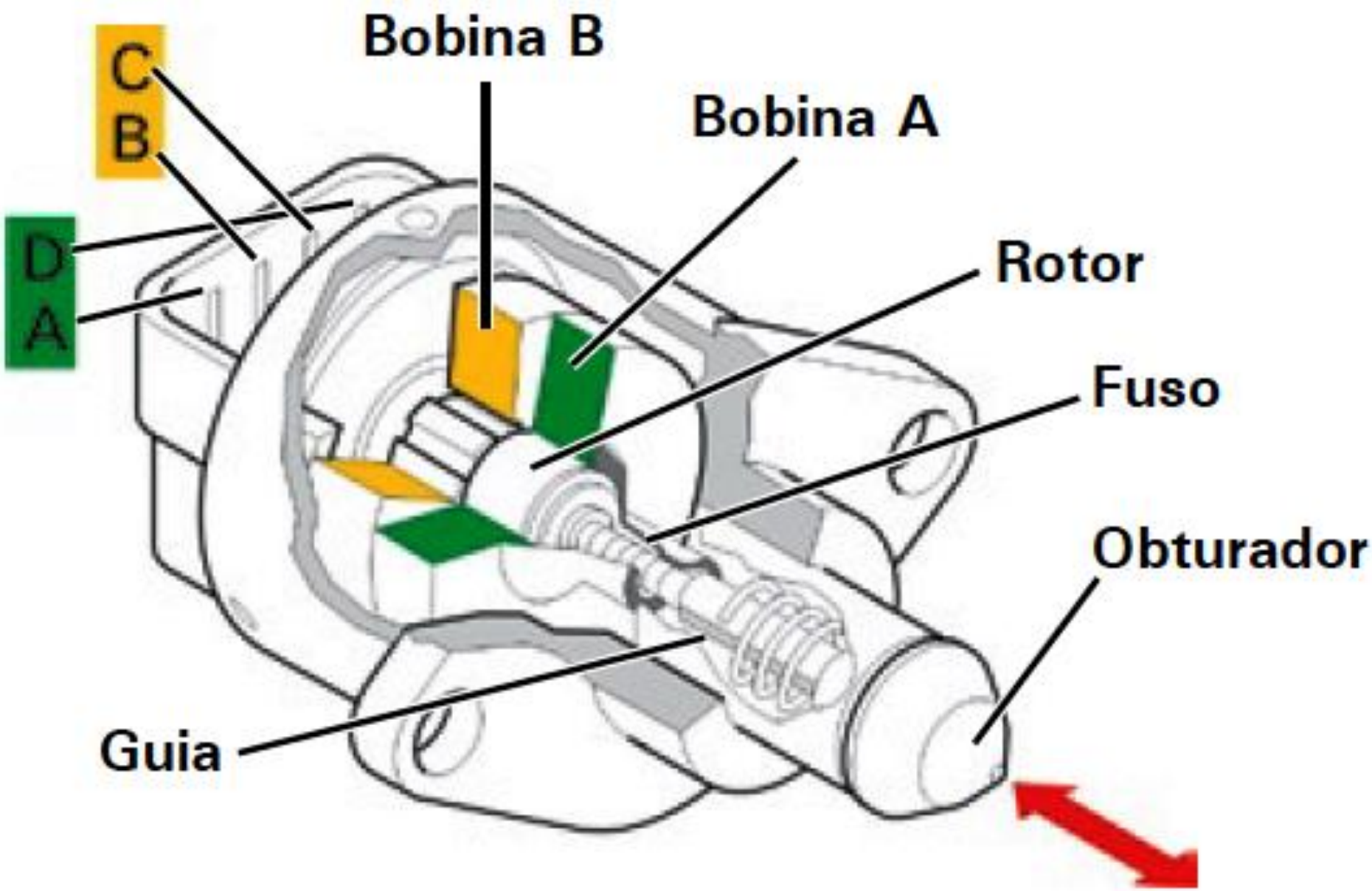
c = Ponto de ignição corrigido

Simbologia do sensor no esquema elétrico

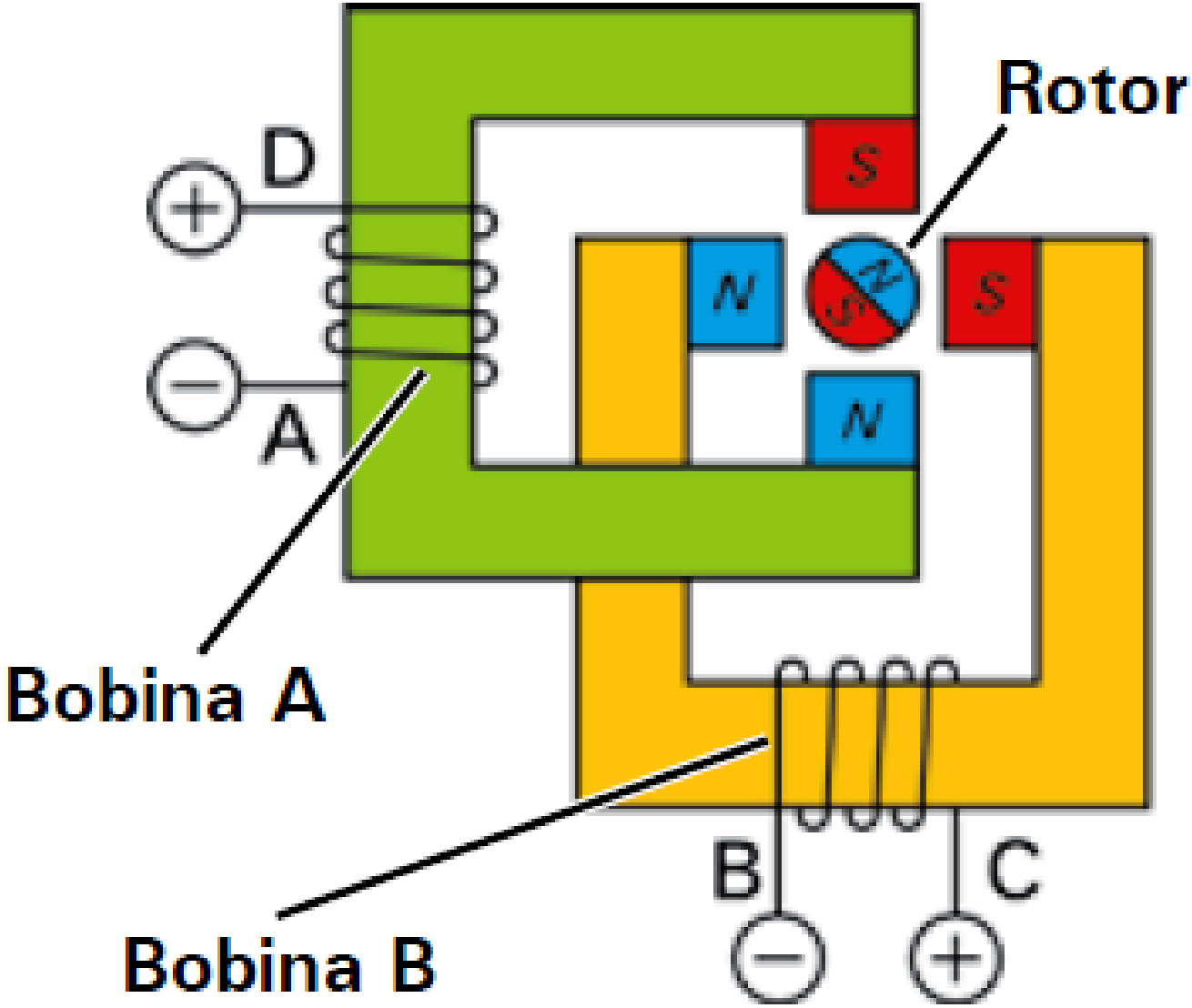


CORRETOR DE MARCHA LENTA

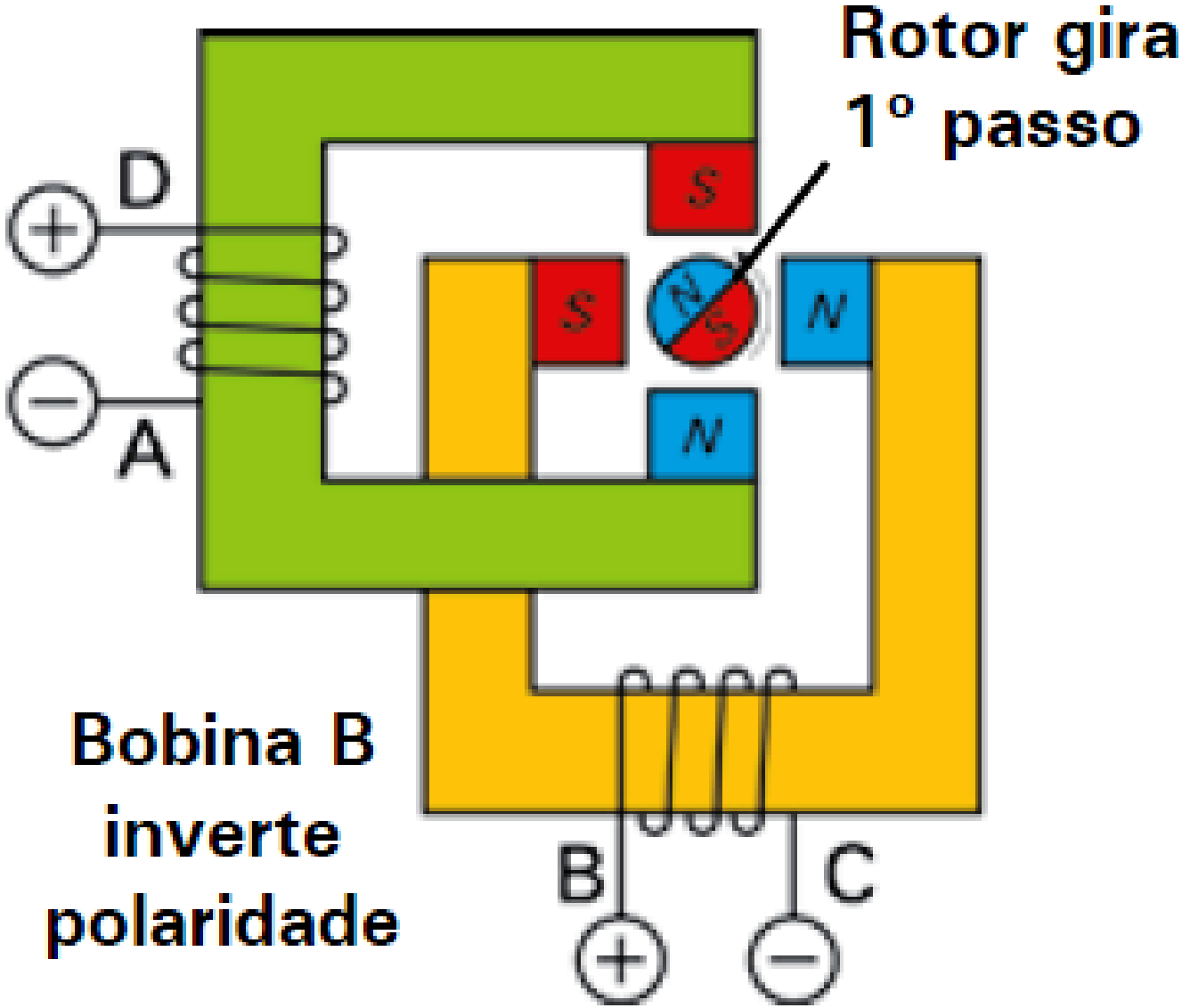



Bobina B
C
B
Bobina A
D
A
Rotor
Fuso
Obturador
Guia

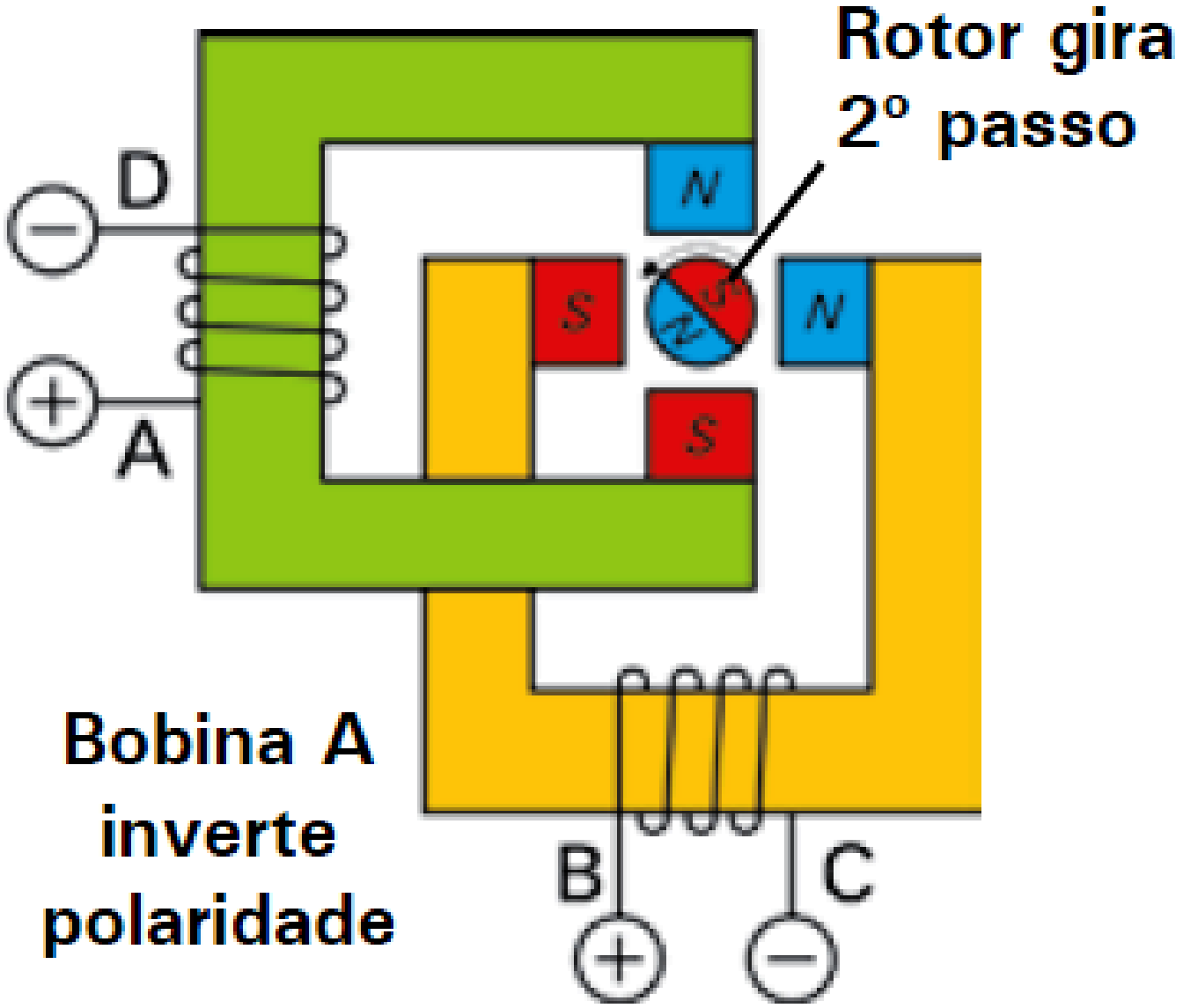
Passo 1



Passo 2


Rotor gira
1º passo
D
A
S
S
N
S
N
N
Bobina B
inverte
polaridade
B
C

Passo 3

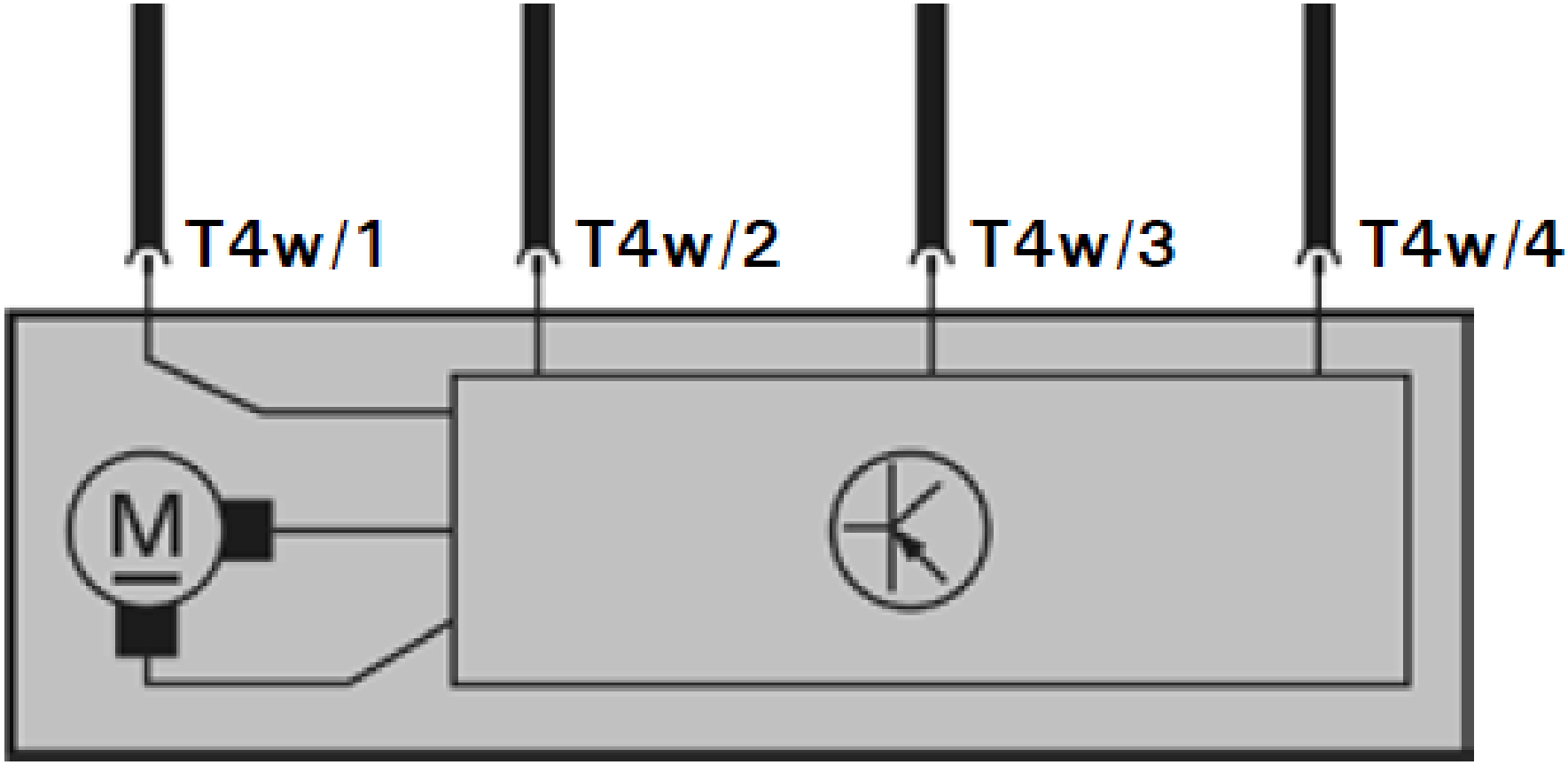


Passo	Bobina A		Bobina B	
	Pino A	Pino D	Pino B	Pino C
1	-	+	-	+
2	-	+	+	-
3	+	-	+	-
4	+	-	-	+
1	-	+	-	+
2				

Retrocede

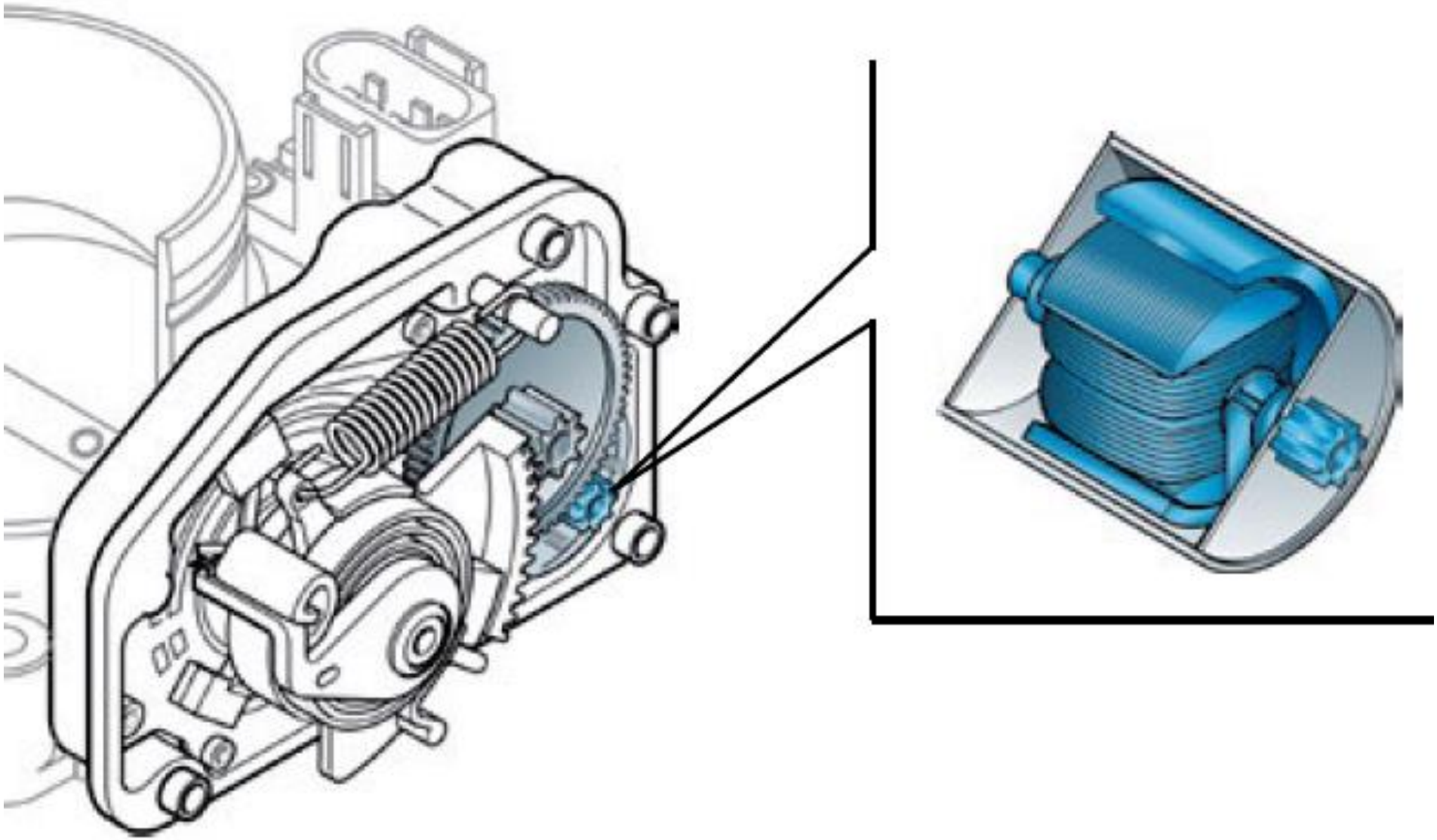
Avança

Simbologia do atuador no esquema elétrico

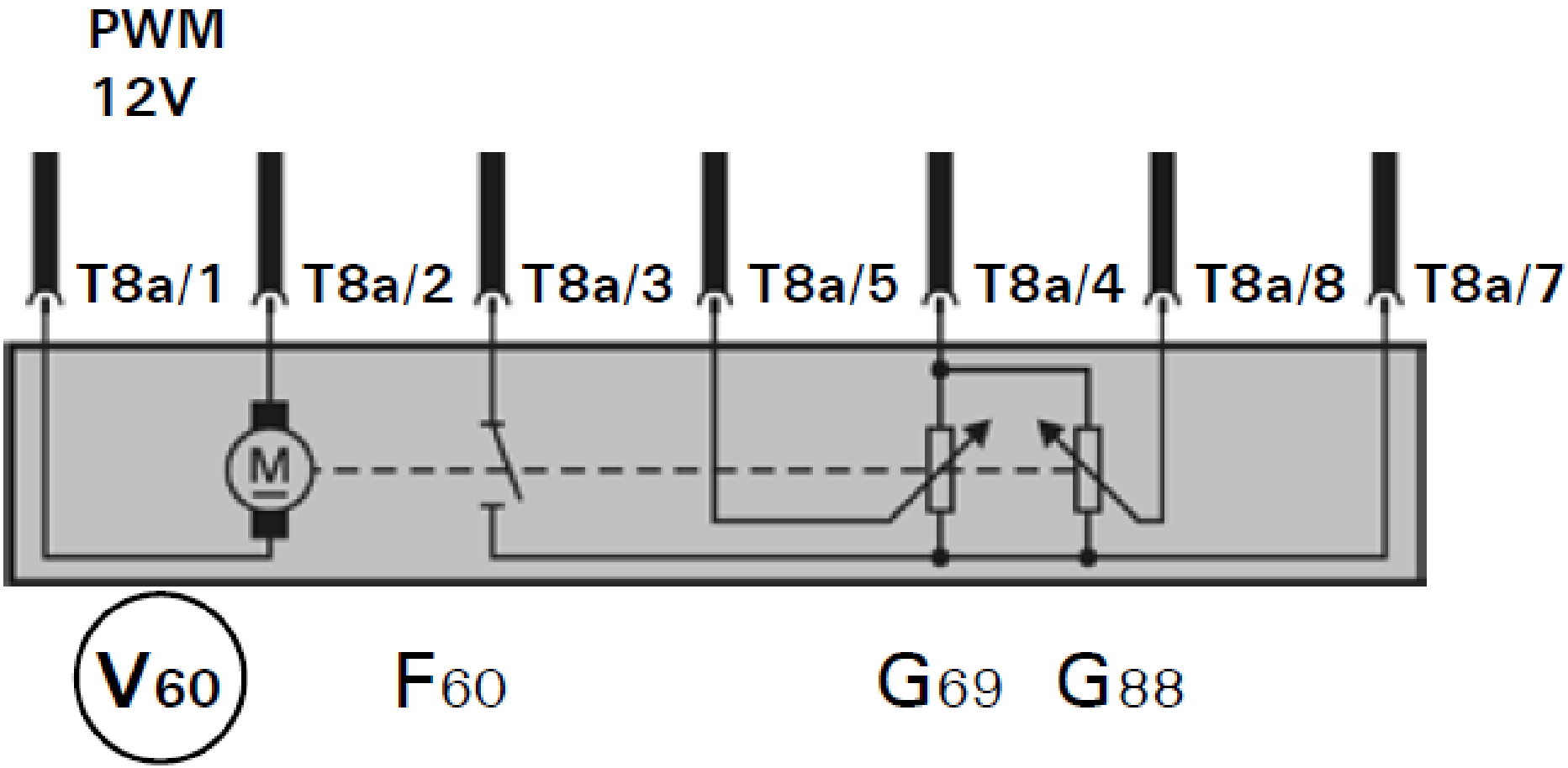


N71

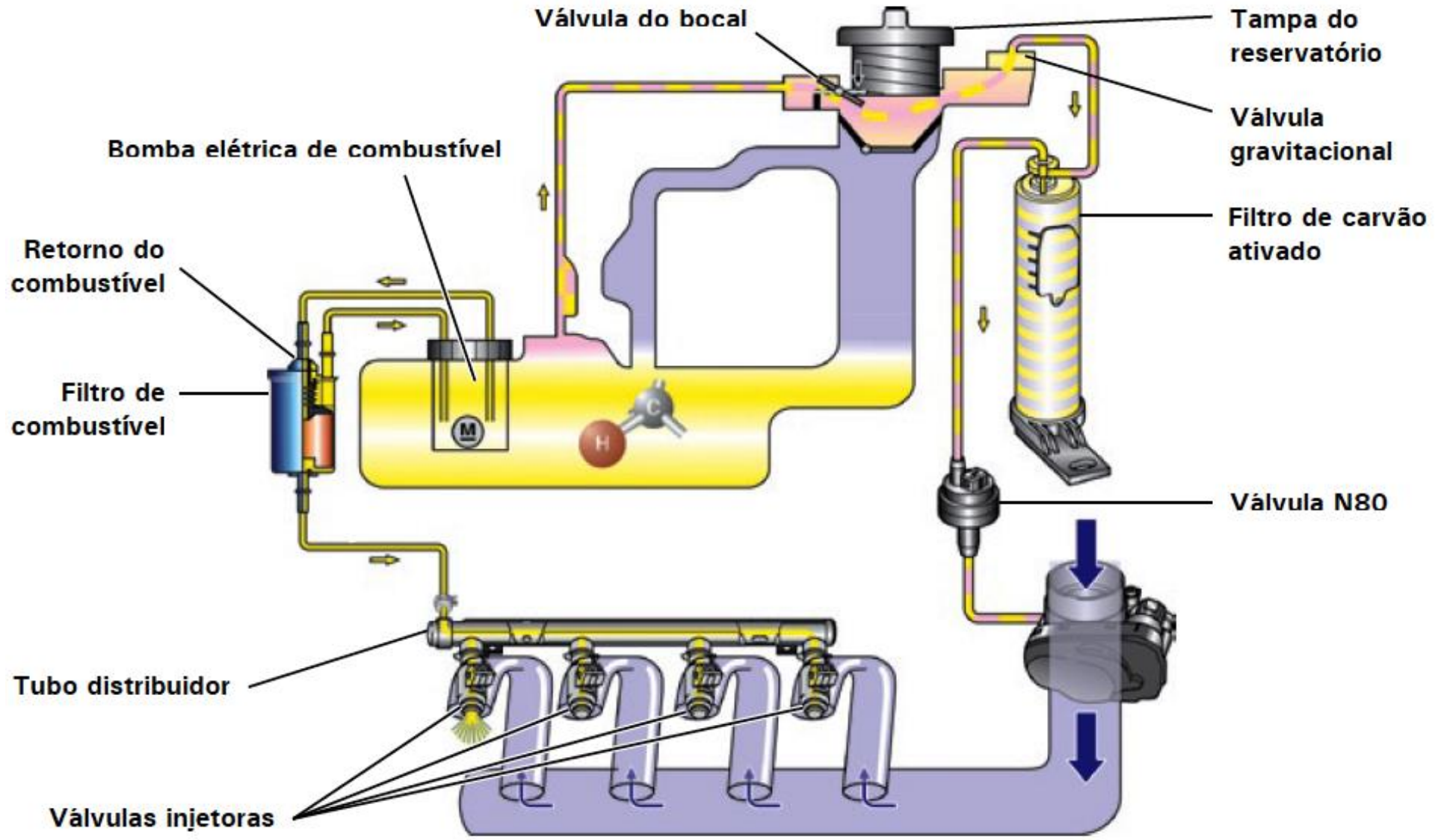
V 60



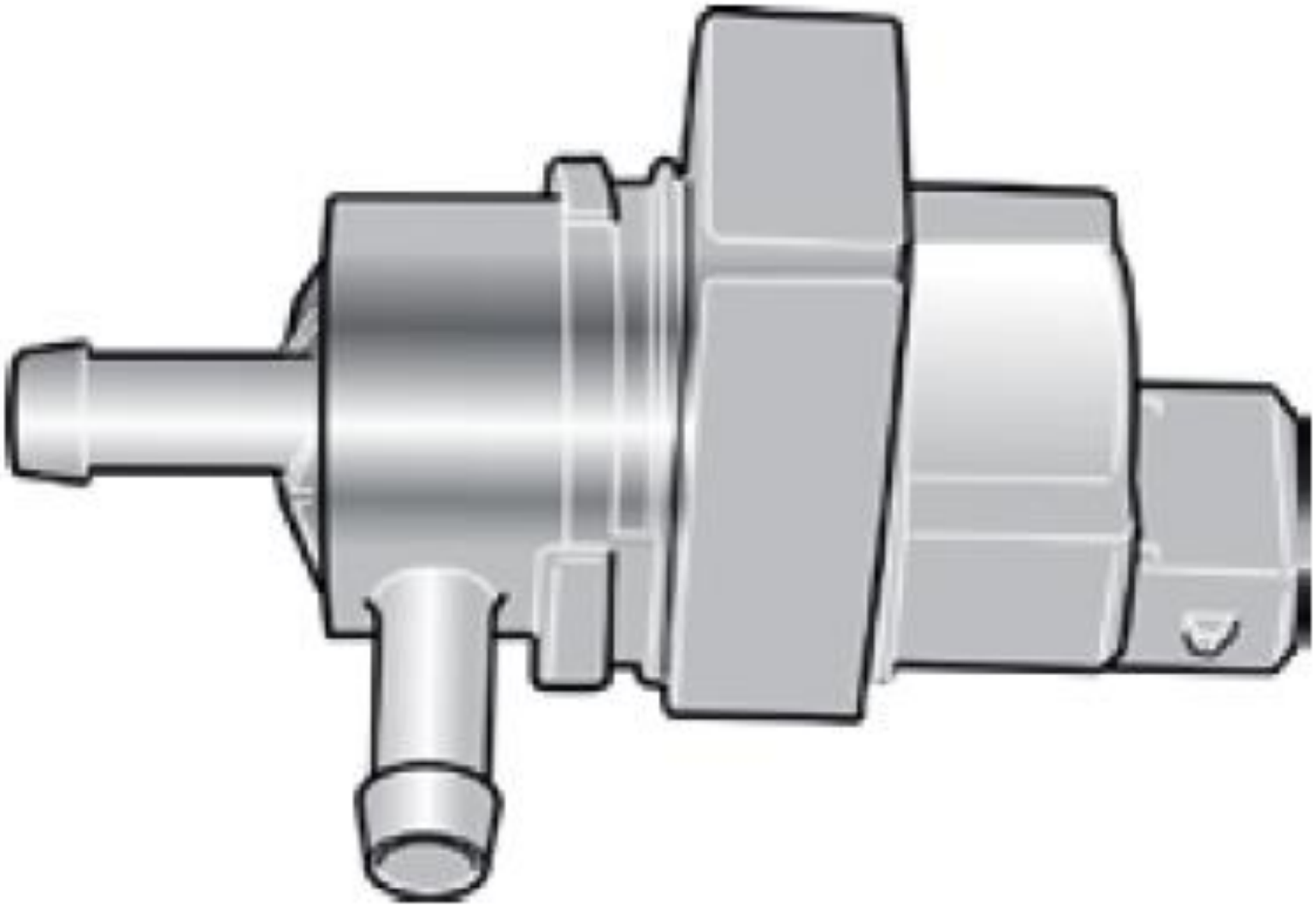
Simbologia do atuador no esquema elétrico

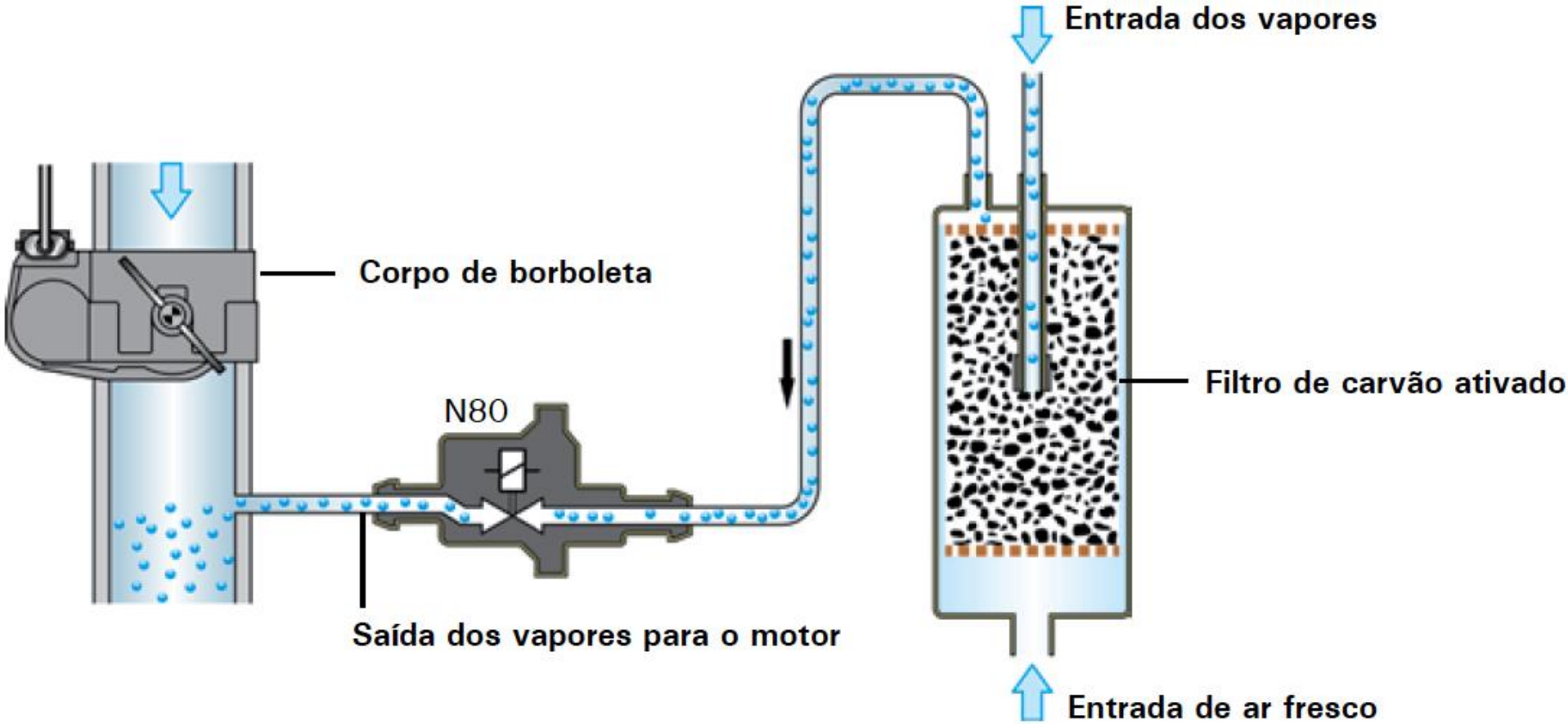


FILTRO DE CARVÃO ATIVADO

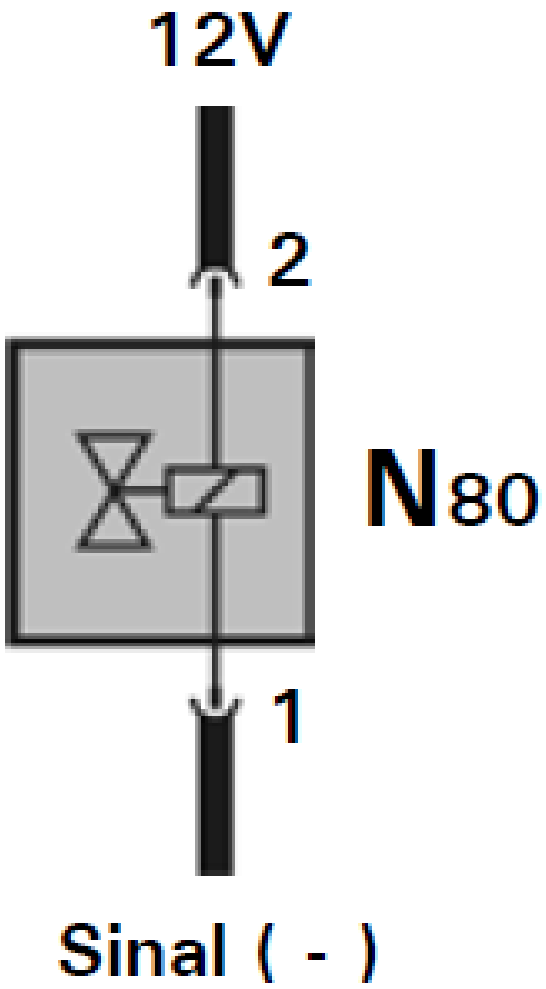


ELETROVÁLVULA N 80



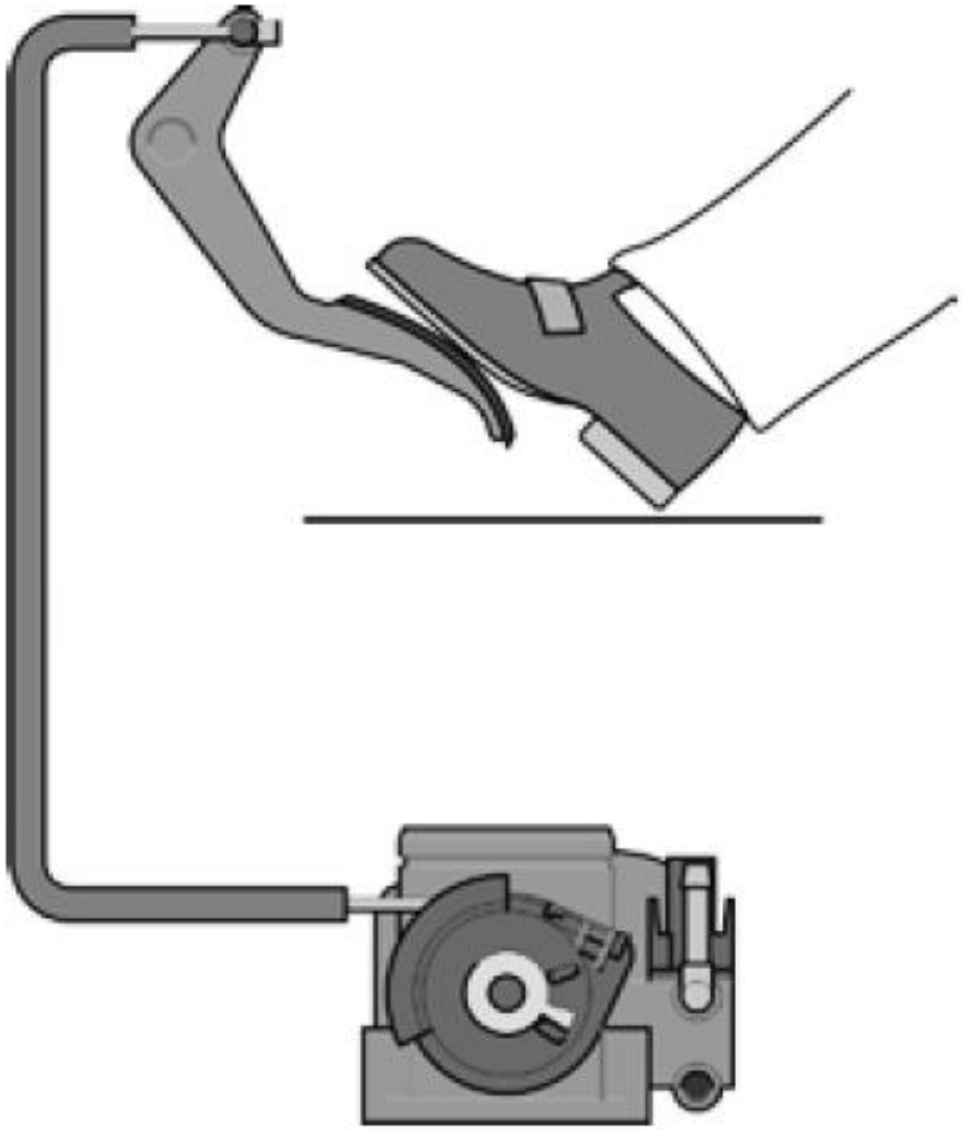

Entrada dos vapores
Corpo de borboleta
N80
Filtro de carvão ativado
Saída dos vapores para o motor
Entrada de ar fresco

Simbologia do atuador no esquema elétrico

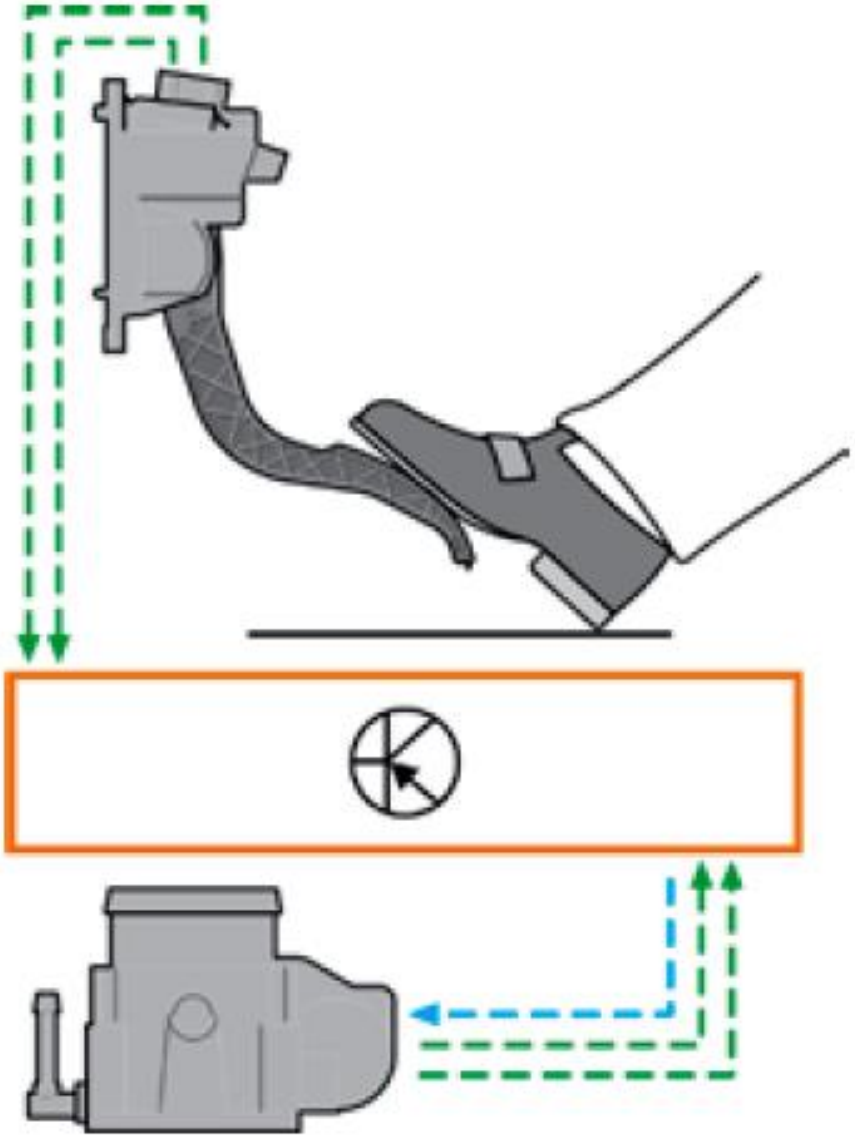


ACELERADOR

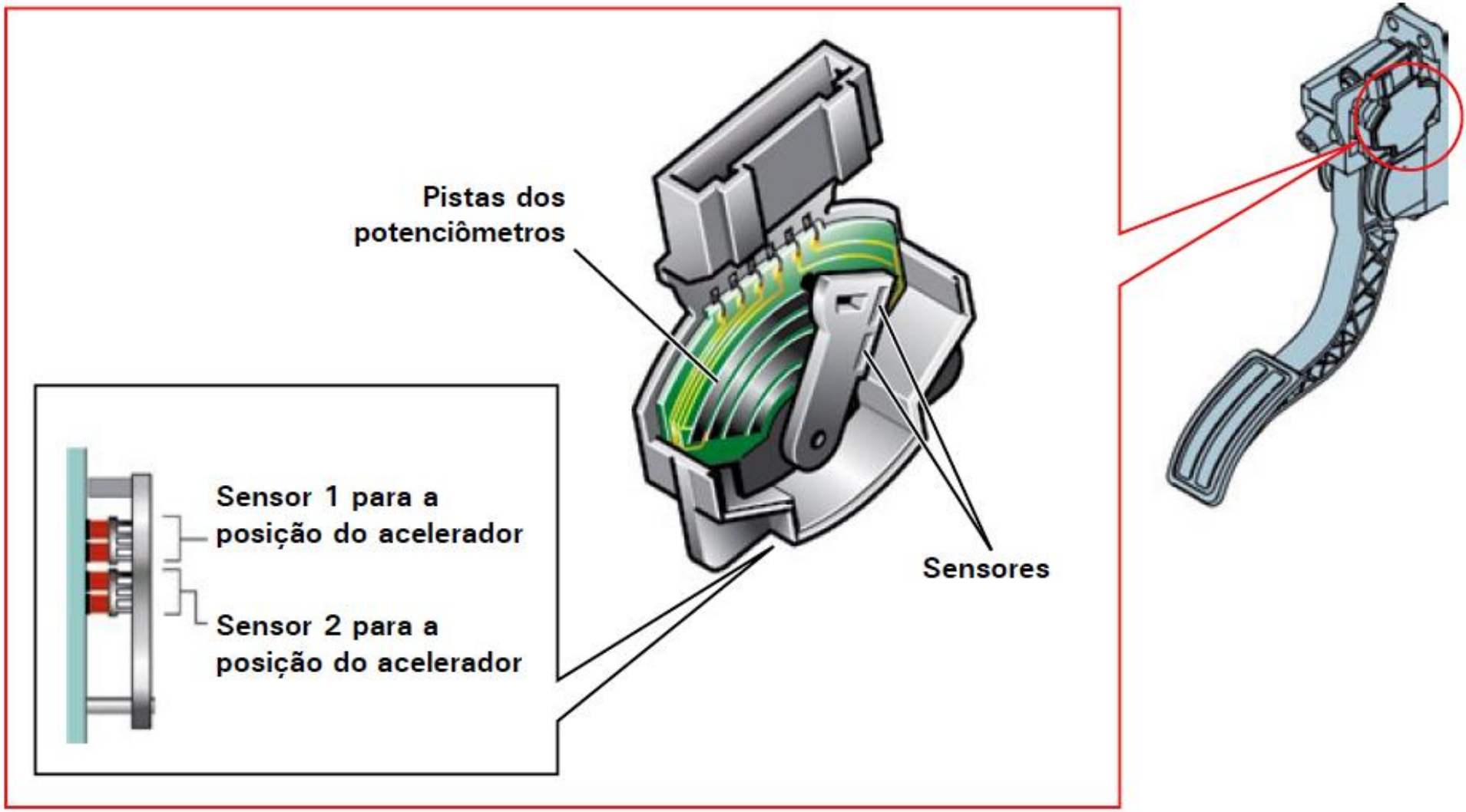
ACIONAMENTO MECÂNICO



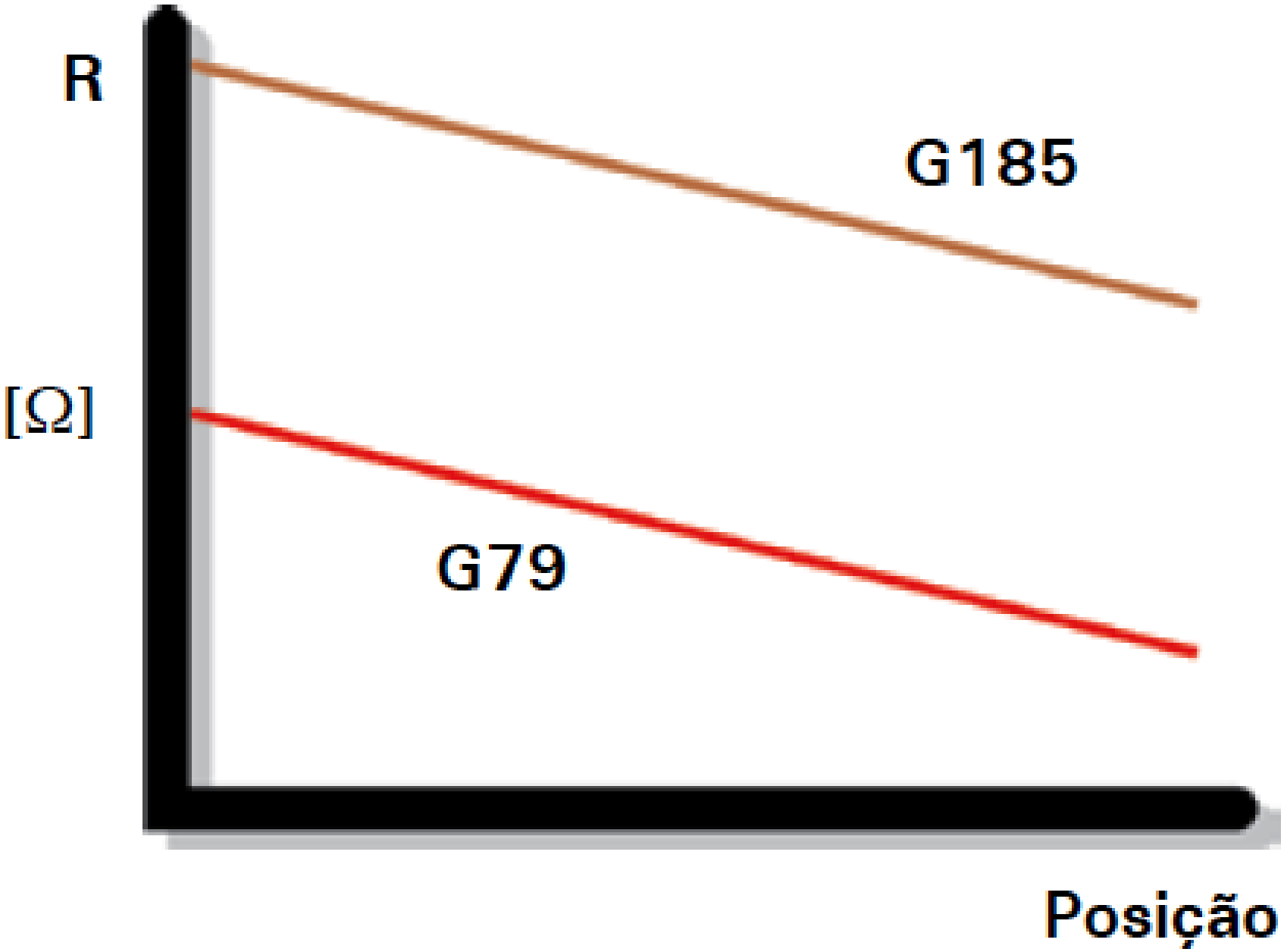
ACELERADOR
ACIONAMENTO ELÉTRICO



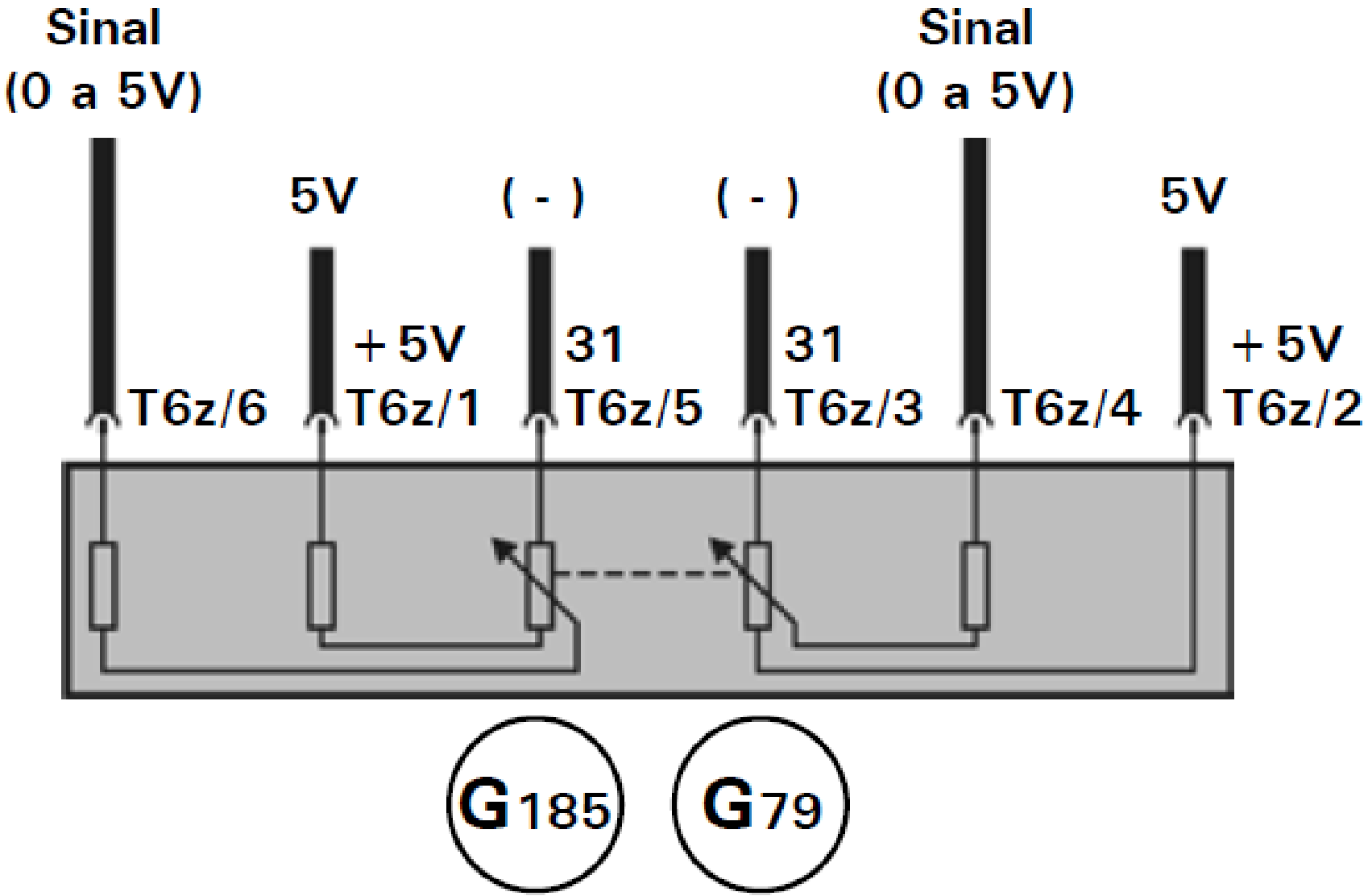
SENSORES G 79 e G 185



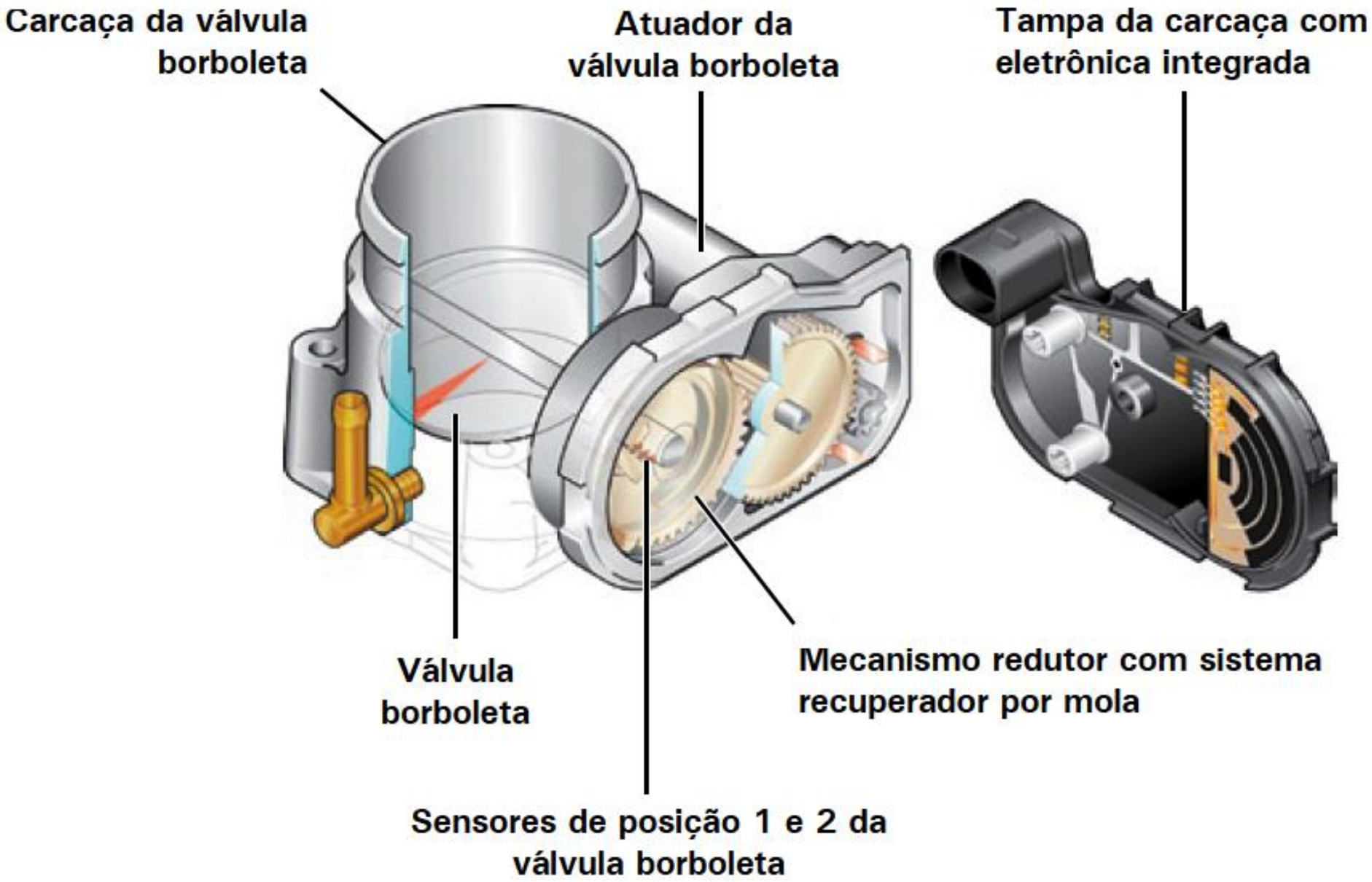
Detalhe do módulo do pedal acelerador, com os sensores G79 e G185


R
[Ω]
G185
G79
Posição

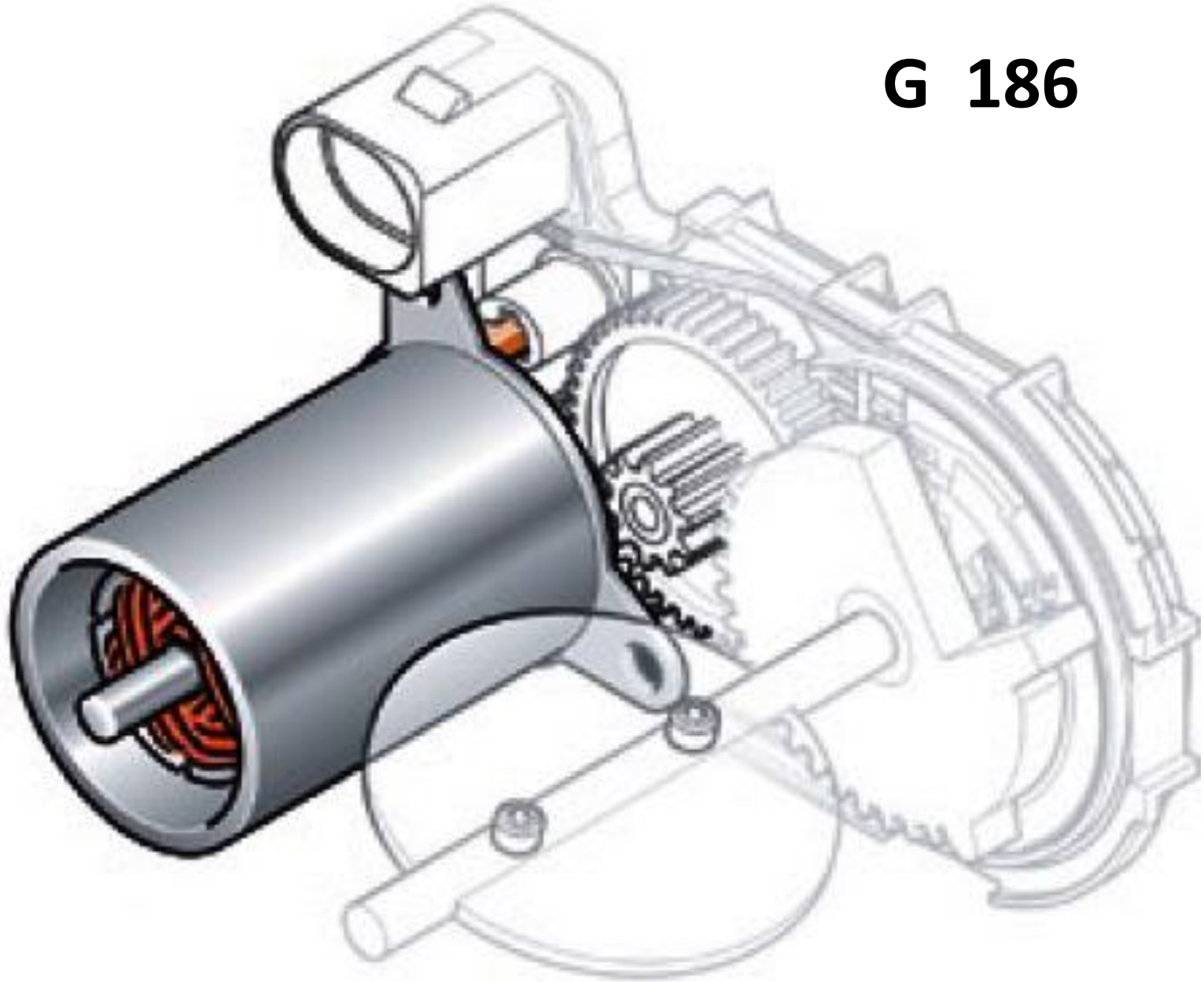
Simbologia dos sensores no esquema elétrico

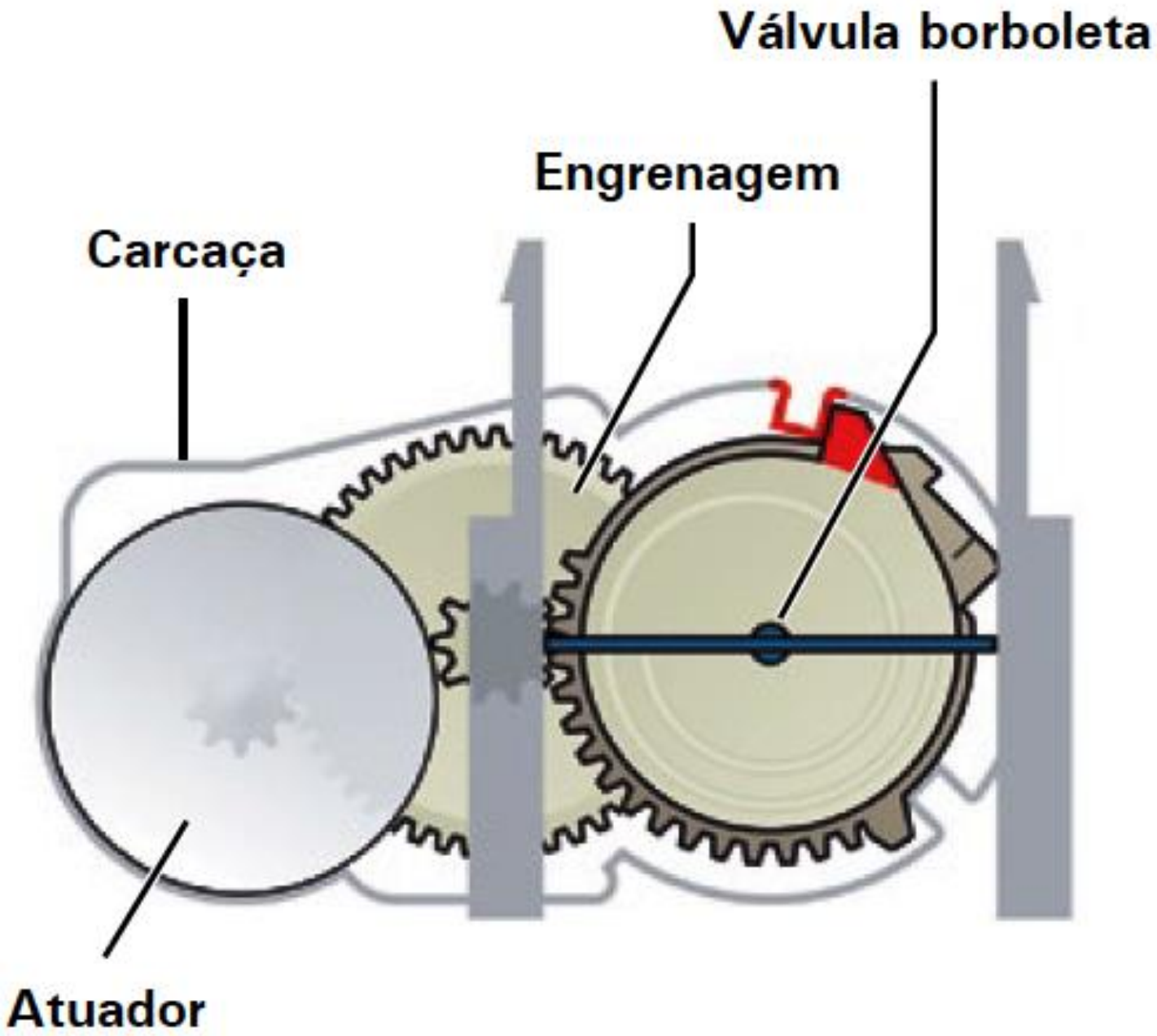


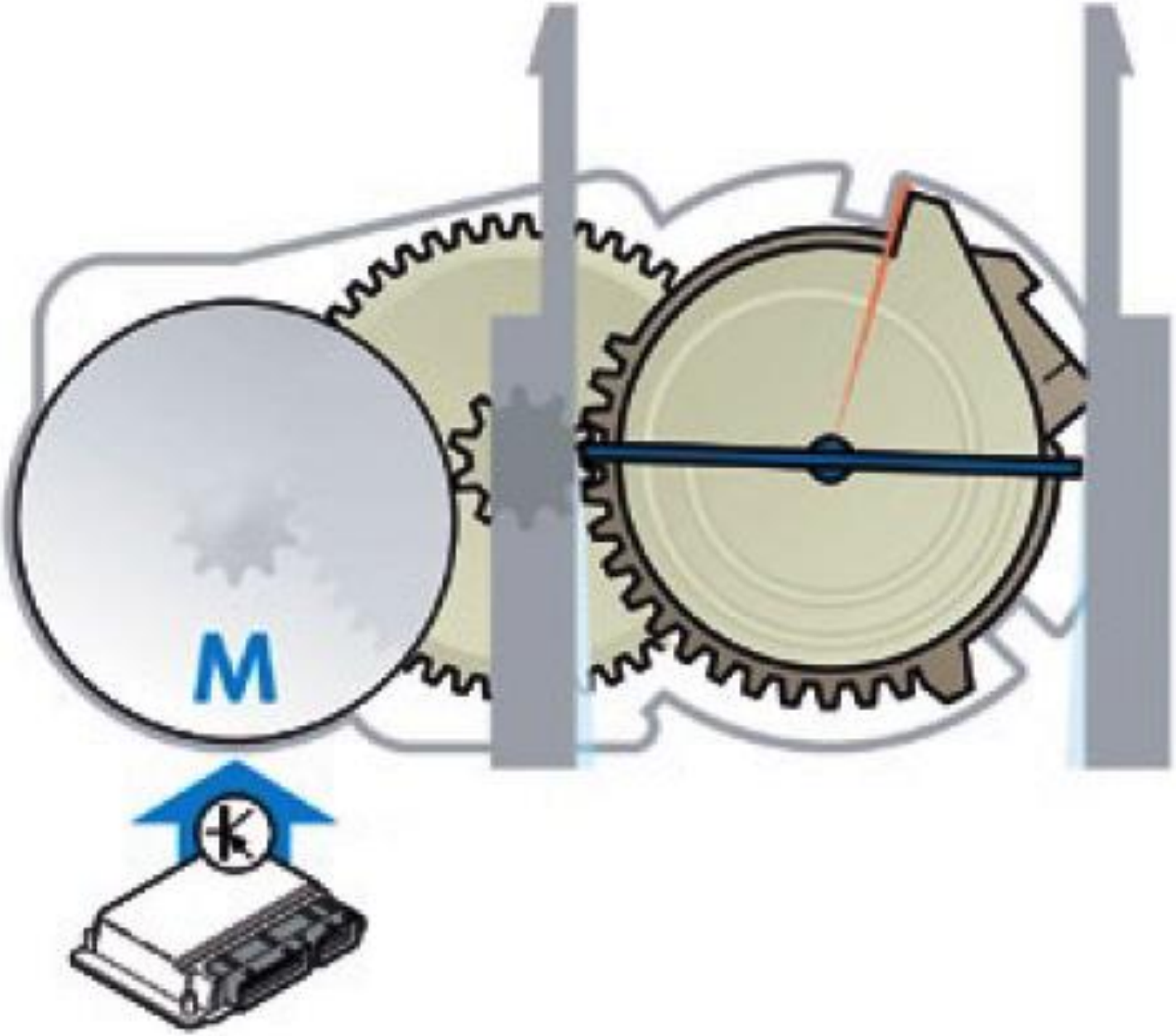
VÁLVULA BORBOLETA

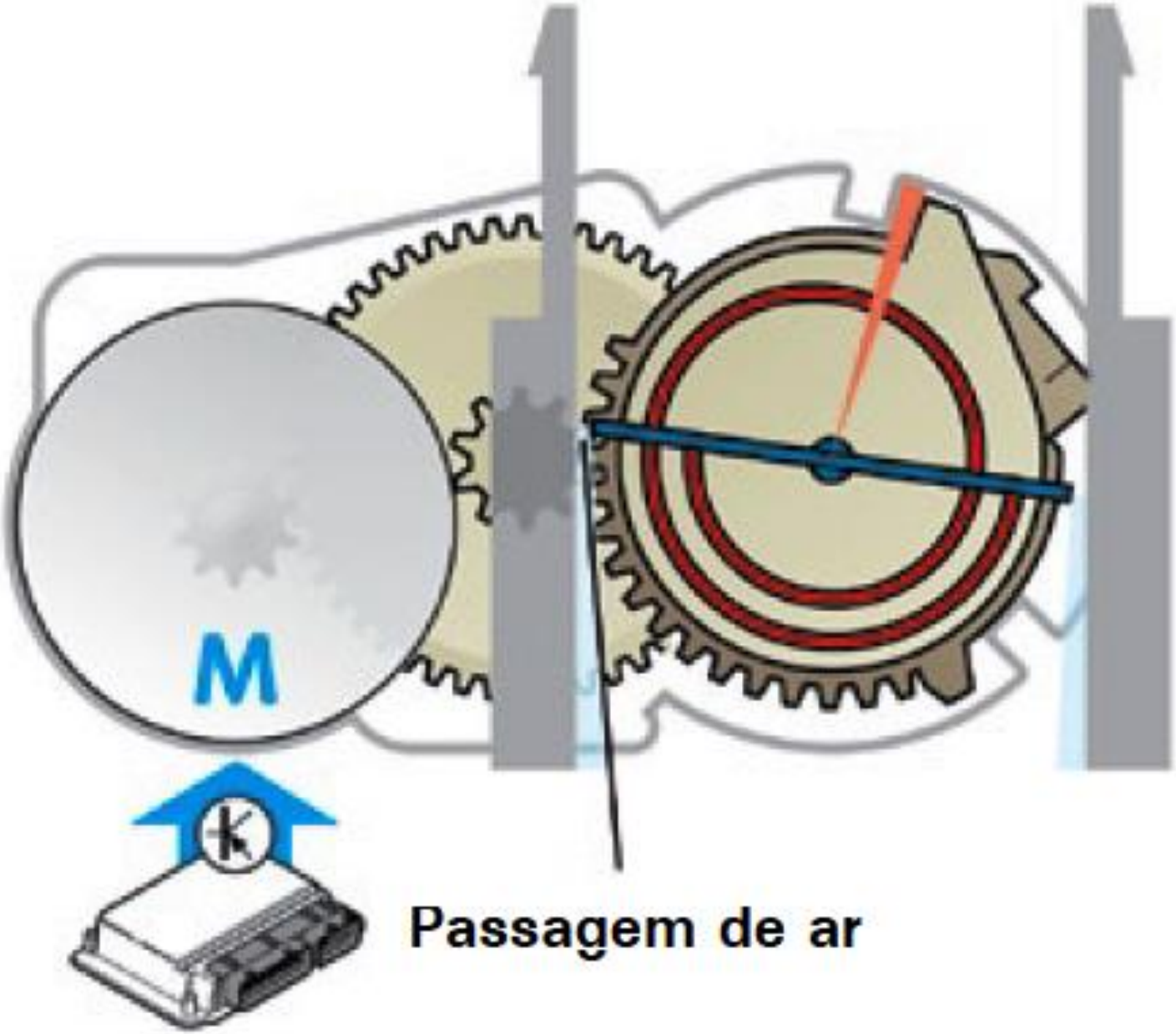


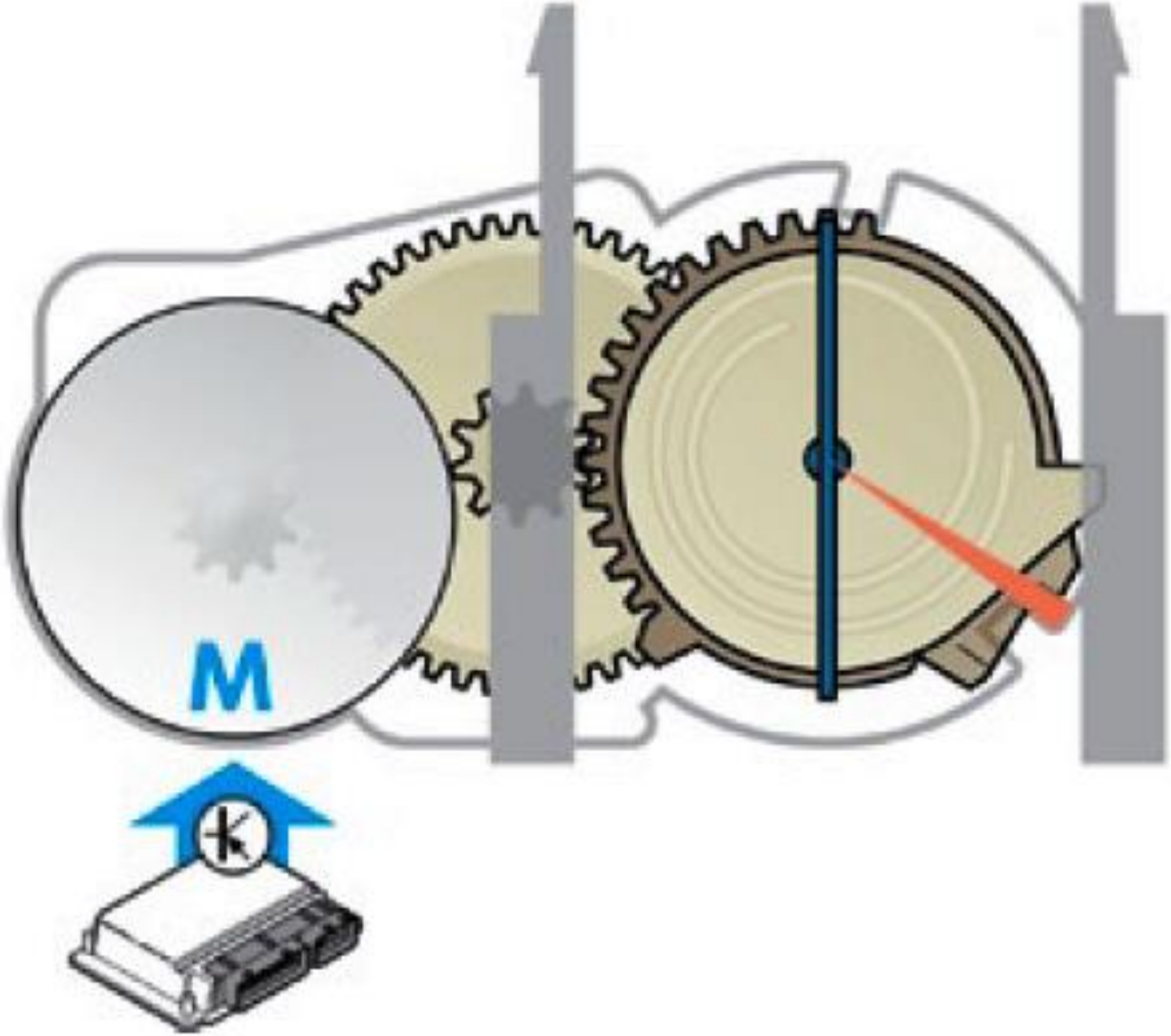
G 186



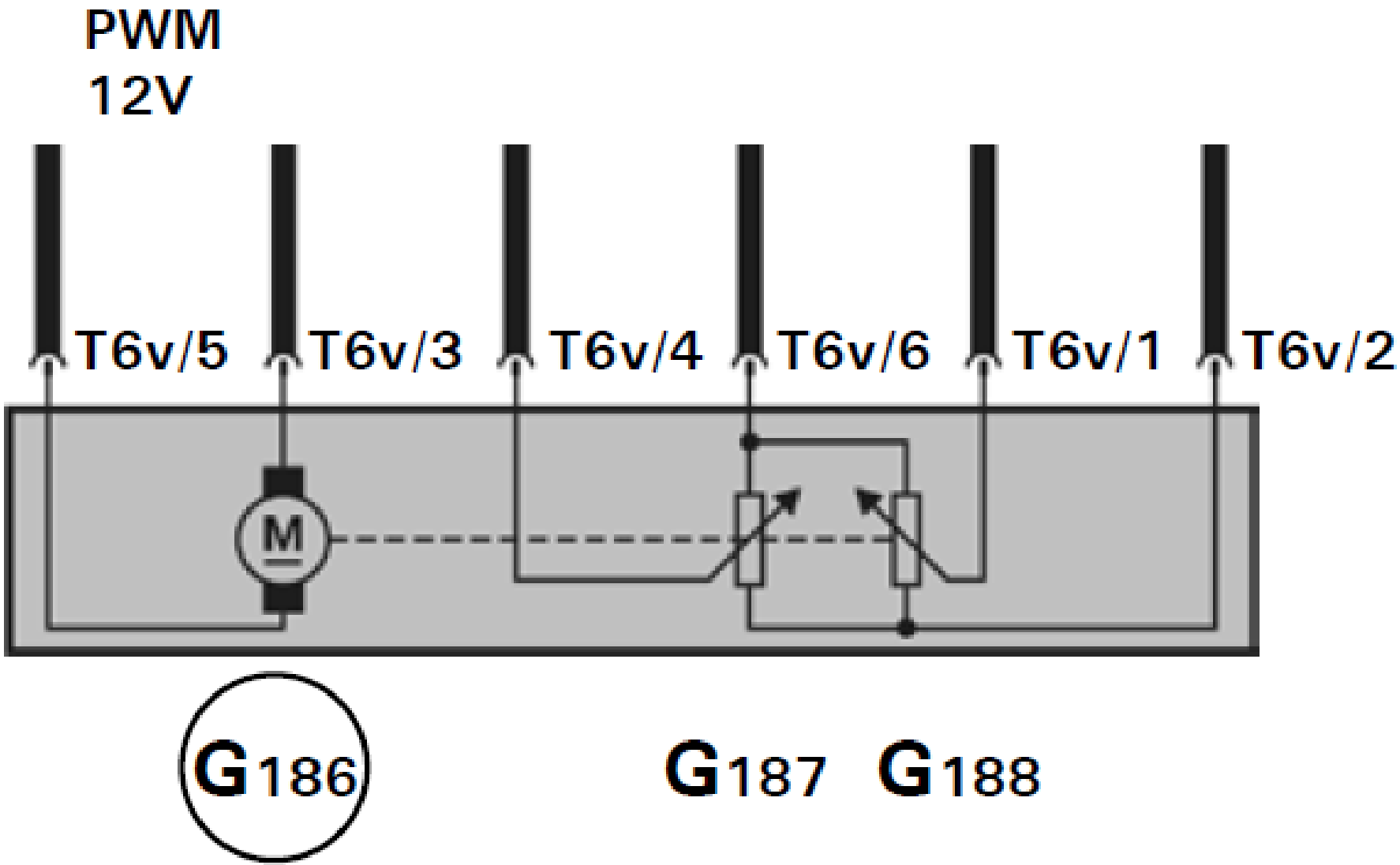

Válvula borboleta
Engrenagem
Carcaça
Atuador

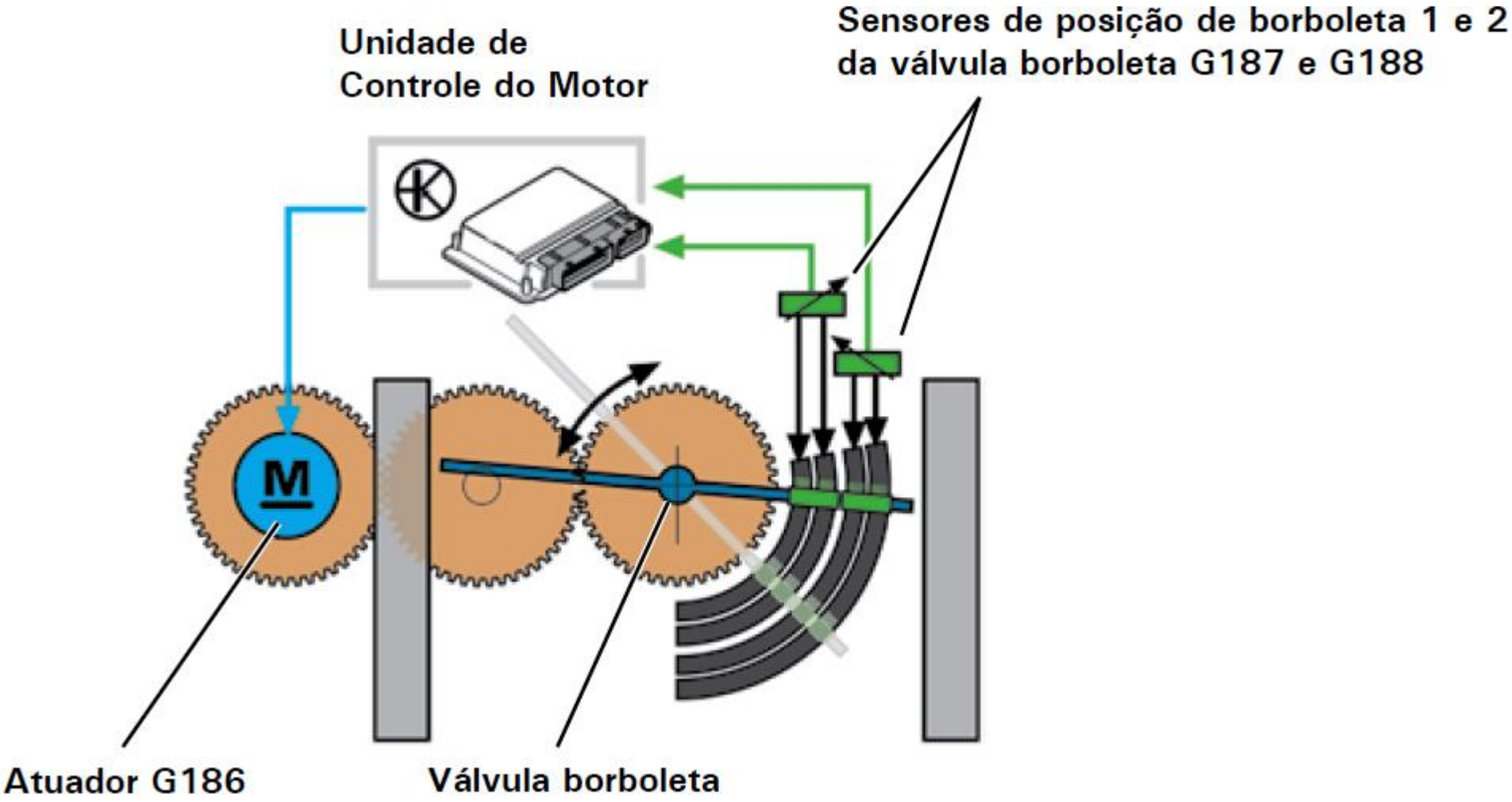

M
K

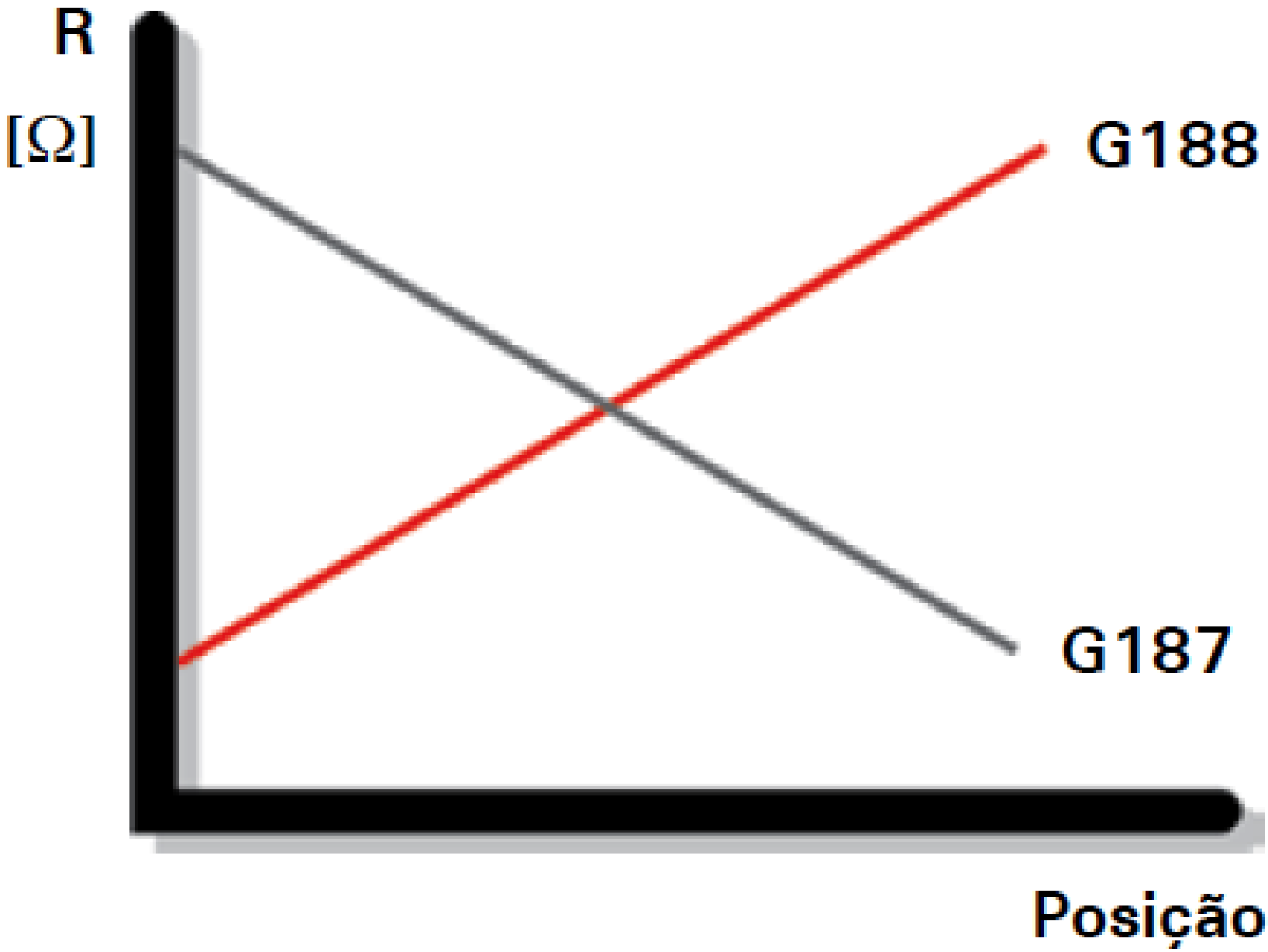

M
k
Passagem de ar


M
K

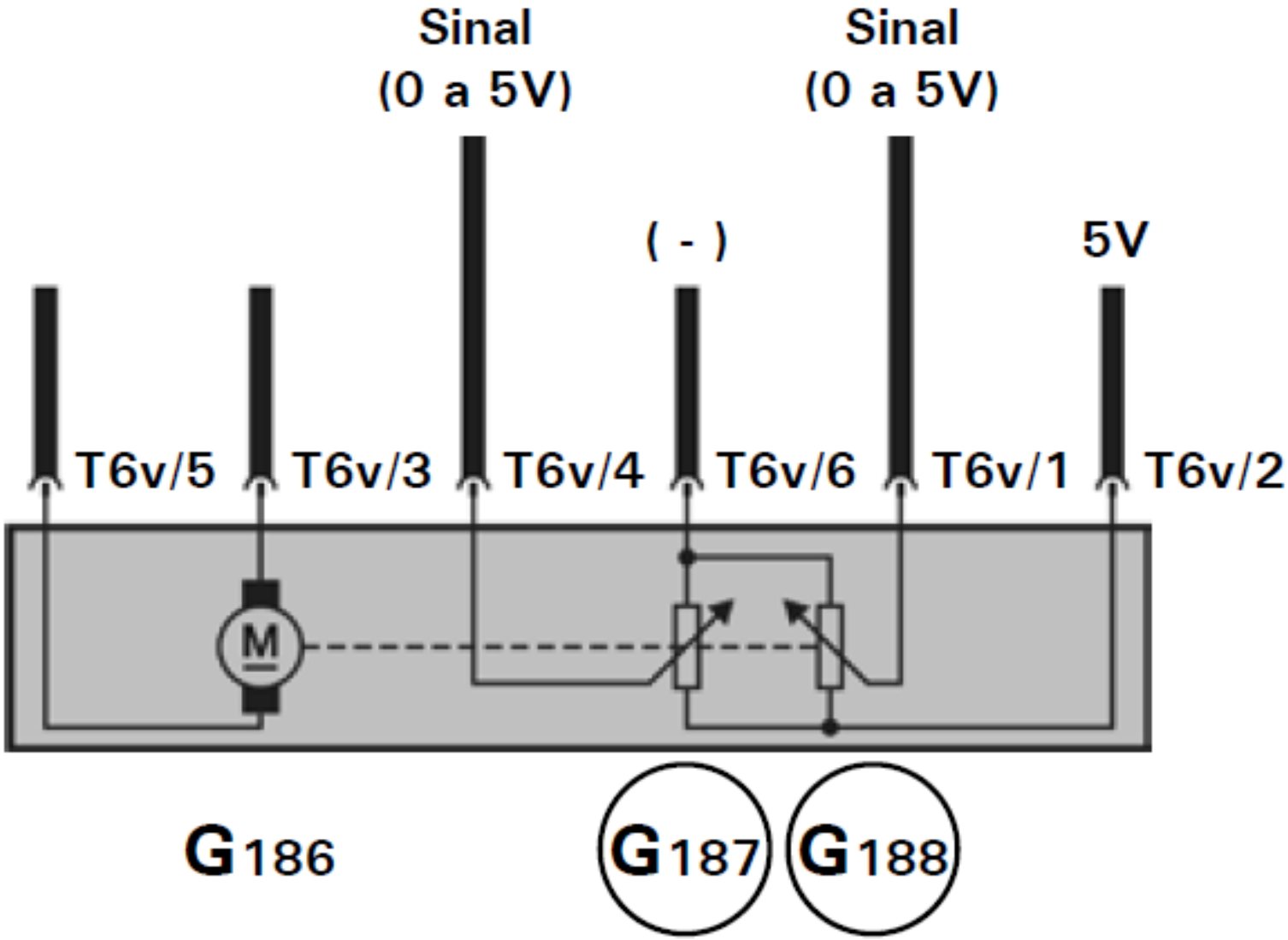
Simbologia do atuador no esquema elétrico




Unidade de
Controle do Motor
Sensores de posição de borboleta 1 e 2
da válvula borboleta G187 e G188
M
Atuador G186
Válvula borboleta

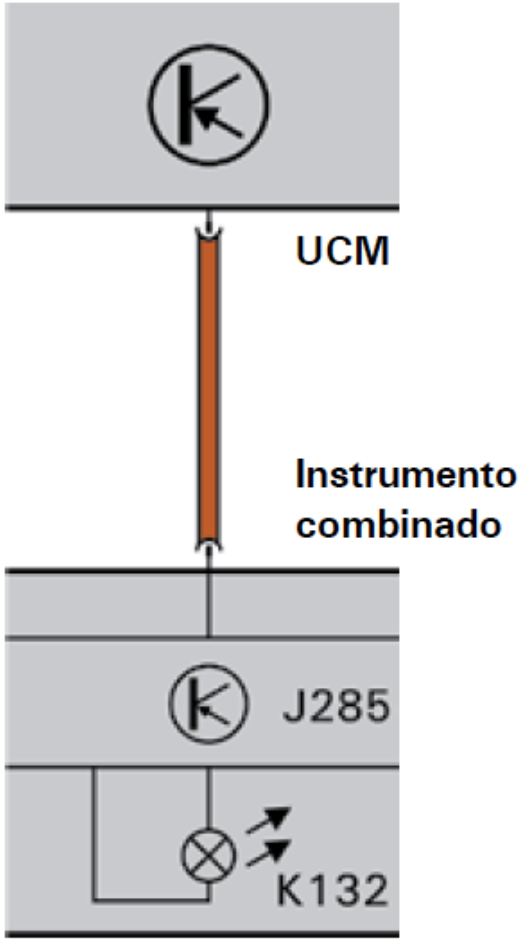

R
[Ω]
G188
G187
Posição

Simbologia dos sensores no esquema elétrico

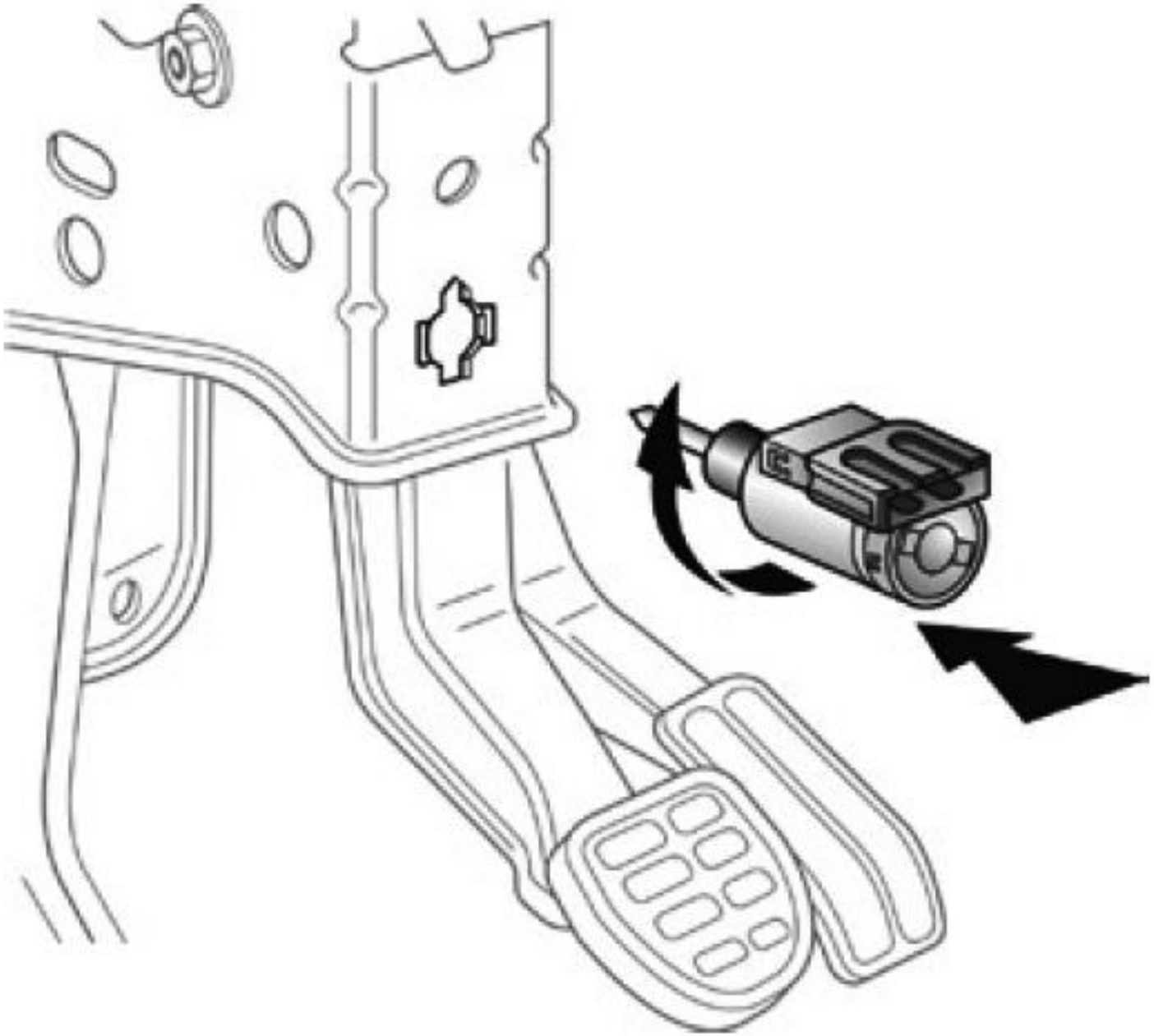


LUZ INDICADORA DE AVARIA

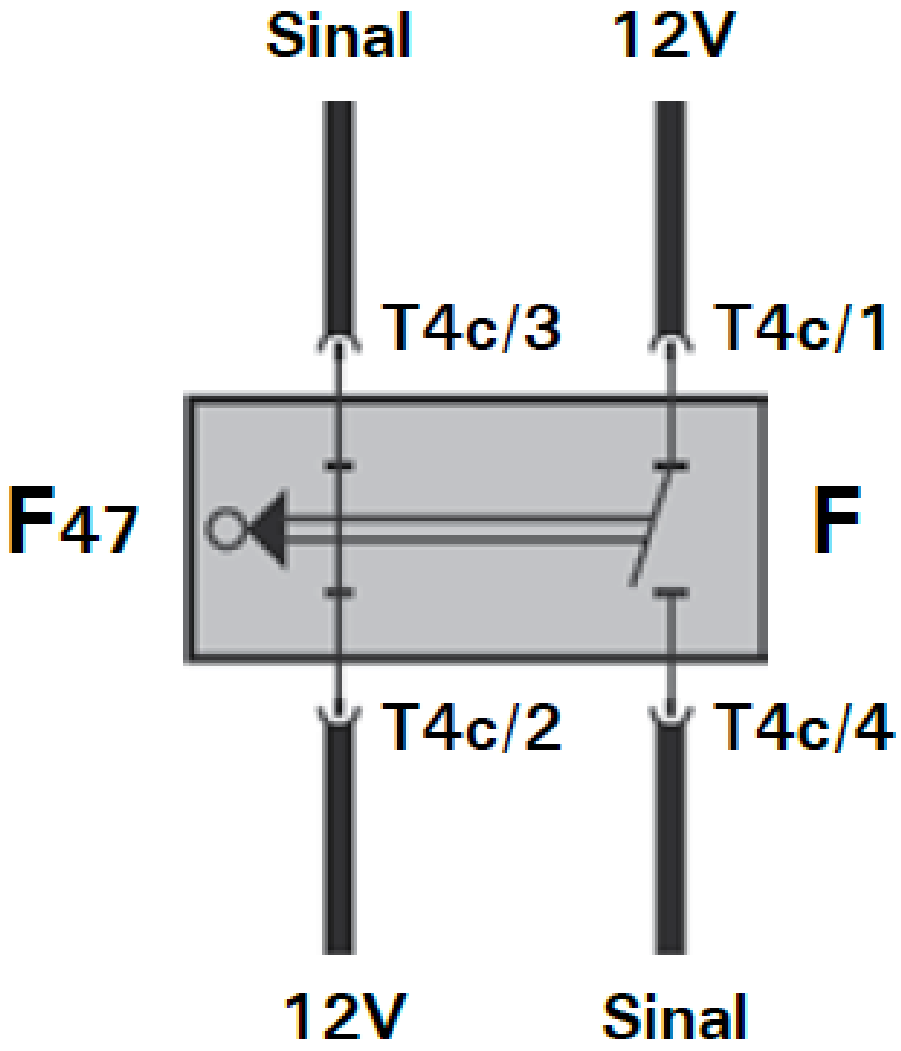
EPC - *Eletronic Power Control*



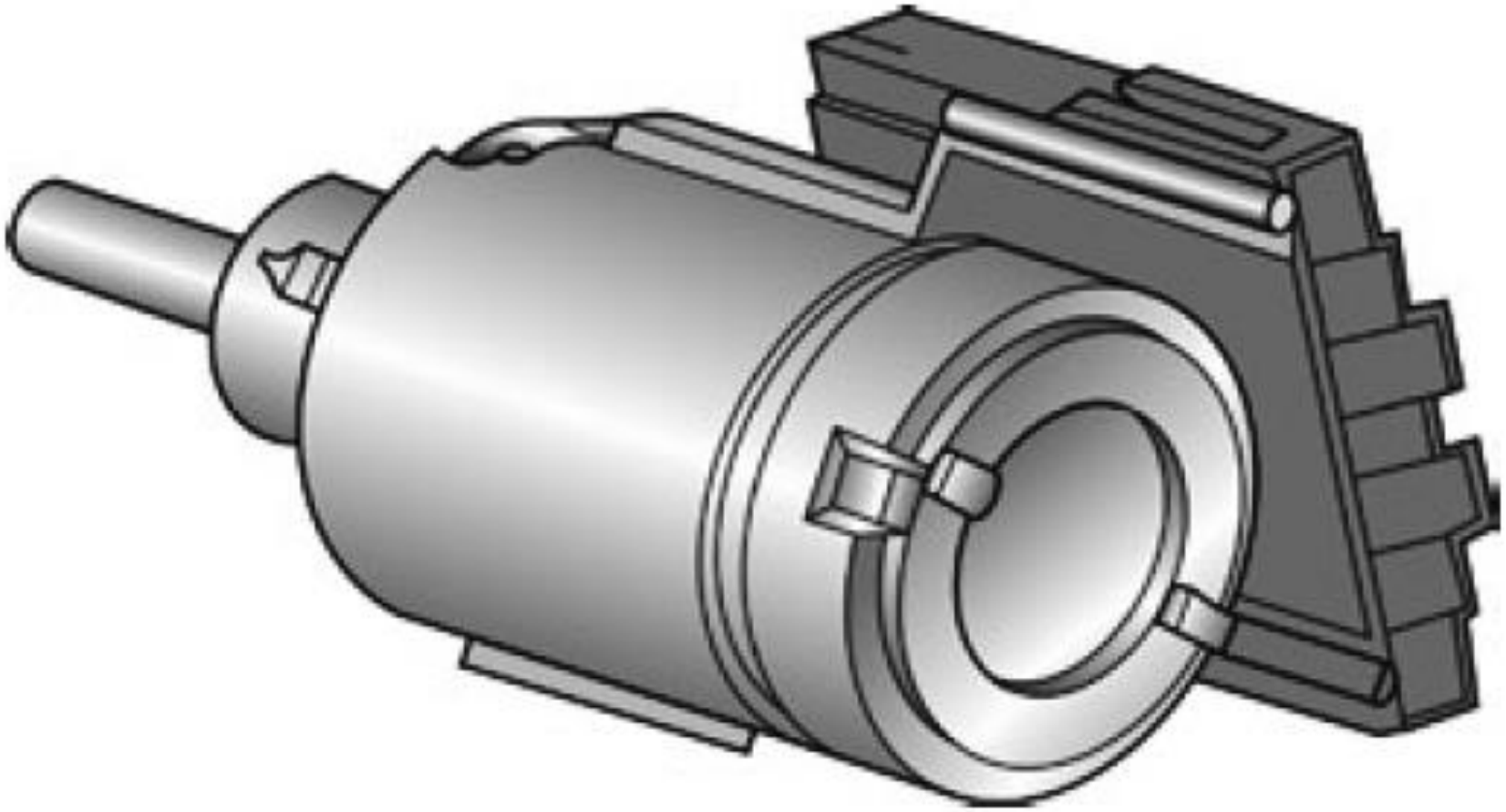
INTERRUPTORES: LUZ E PEDAL DE FREIO



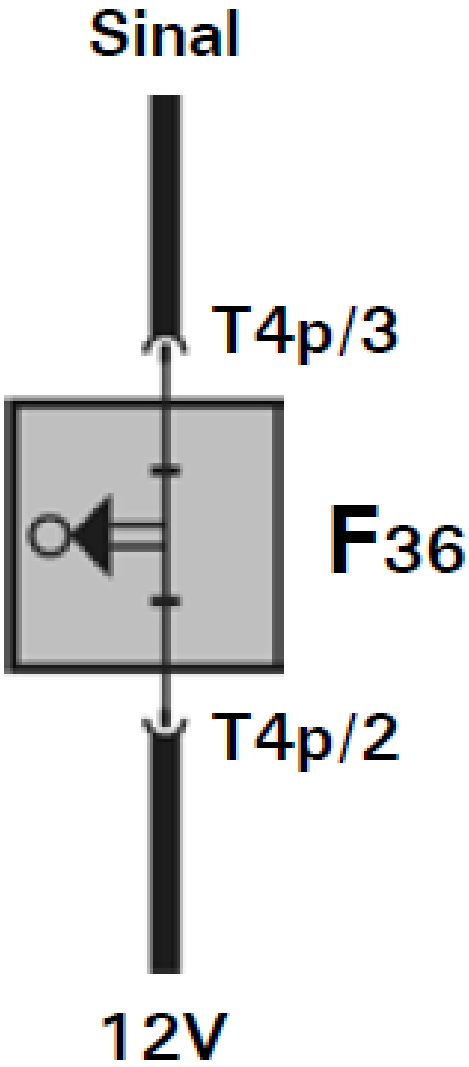
Simbologia dos interruptores no esquema elétrico

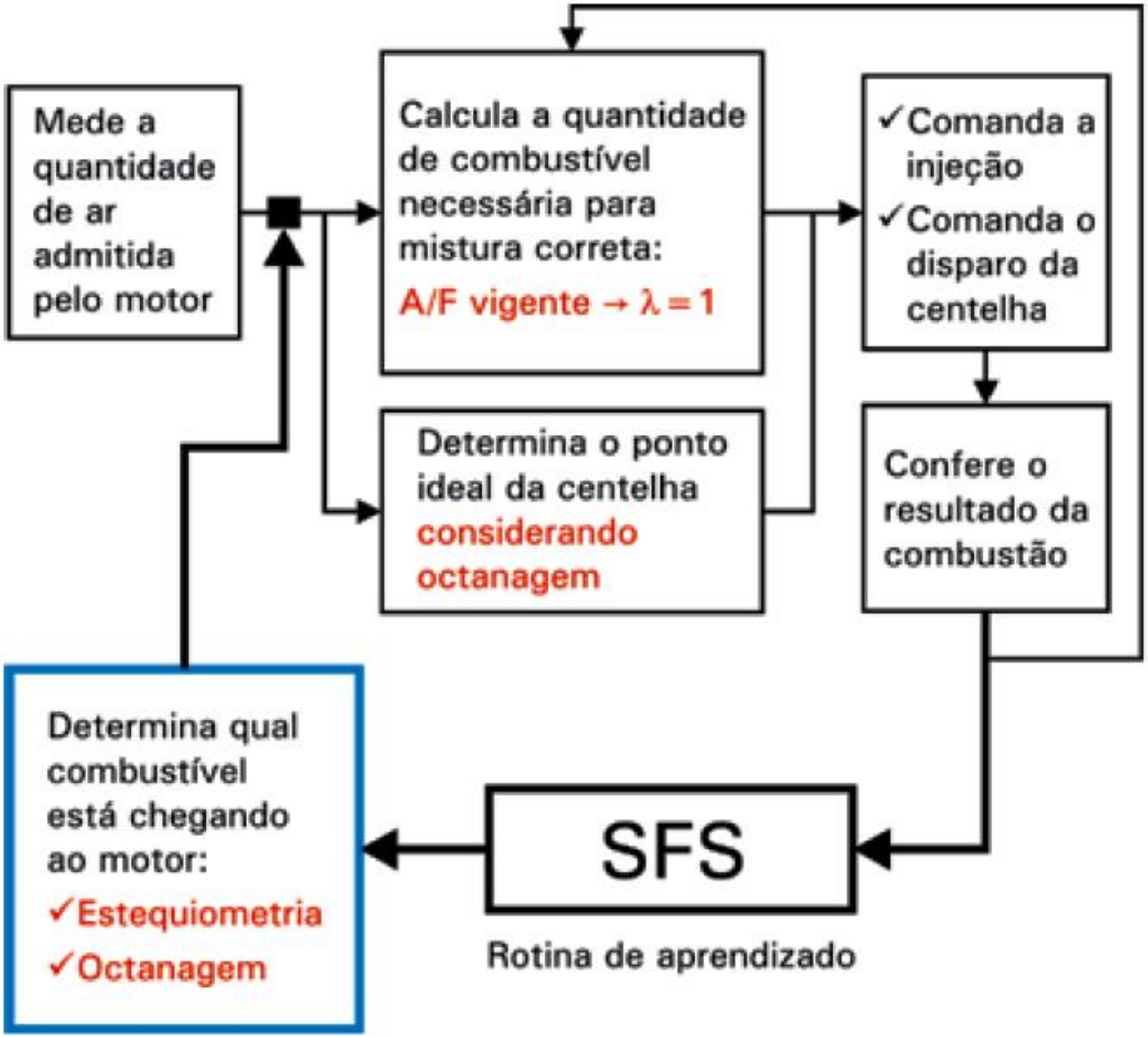


INTERRUPTOR DO PEDAL DA EMBREAGEM F 36

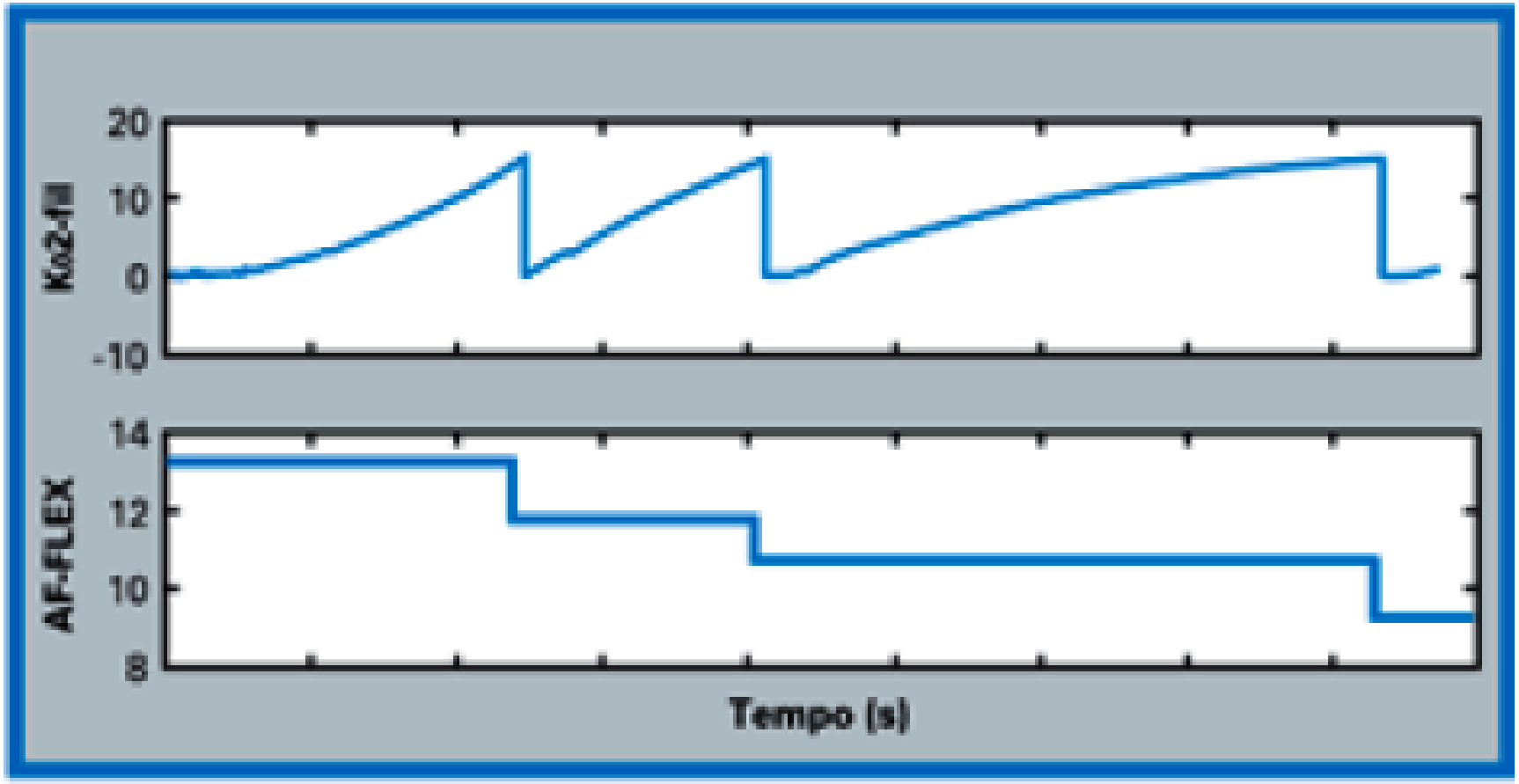


Simbologia do interruptor no esquema elétrico

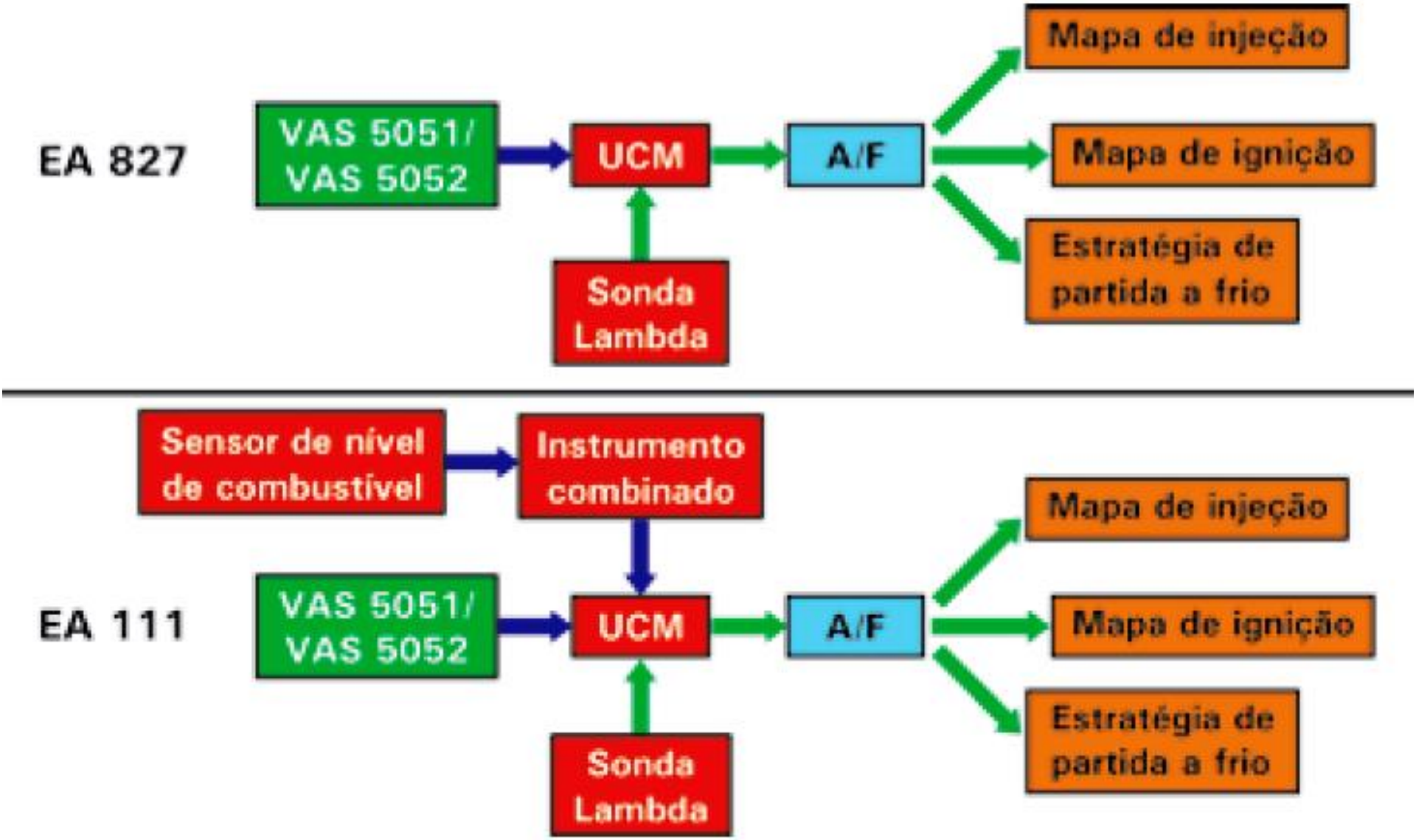


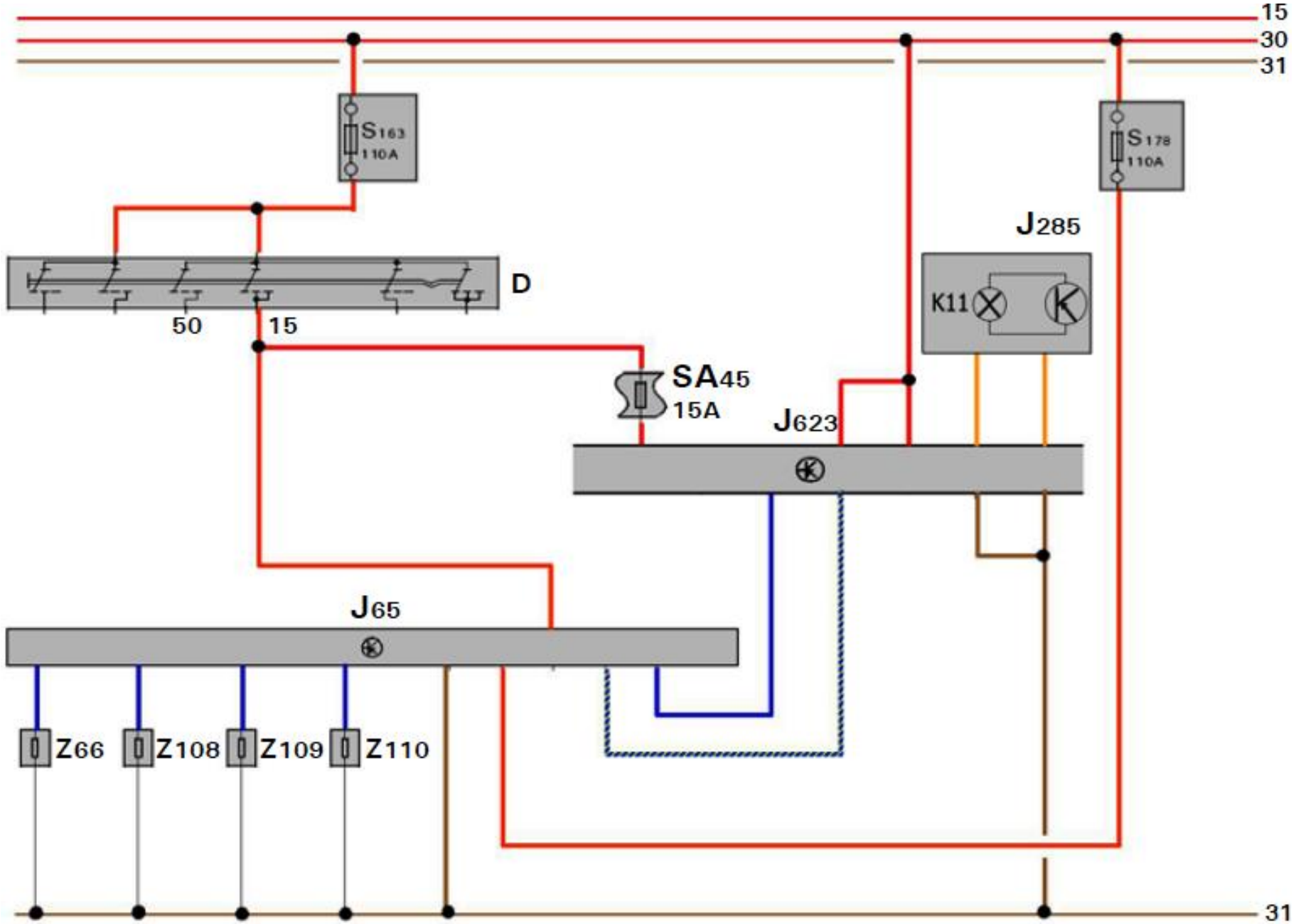

Mede a quantidade de ar admitida pelo motor
Calcula a quantidade de combustível necessária para mistura correta:
A/F vigente → λ = 1
✓Comanda a injeção
✓Comanda o disparo da centelha
Determina o ponto ideal da centelha considerando octanagem
Confere o resultado da combustão
Determina qual combustível está chegando ao motor:
✓Estequiometria
✓Octanagem
SFS
Rotina de aprendizado

KO_2 = fator de correção



Exemplo de aprendizado na alteração do combustível de gasolina para álcool


EA 827
VAS 5051/
VAS 5052
UCM
A/F
Mapa de injeção
Mapa de ignição
Estratégia de partida a frio
Sonda Lambda
EA 111
Sensor de nível de combustível
Instrumento combinado
VAS 5051/
VAS 5052
UCM
A/F
Mapa de injeção
Mapa de ignição
Estratégia de partida a frio
Sonda Lambda


15
30
31
S163
110A
S178
110A
J285
K11
D
50
15
SA45
15A
J623
J65
Z66
Z108
Z109
Z110
31

Legenda

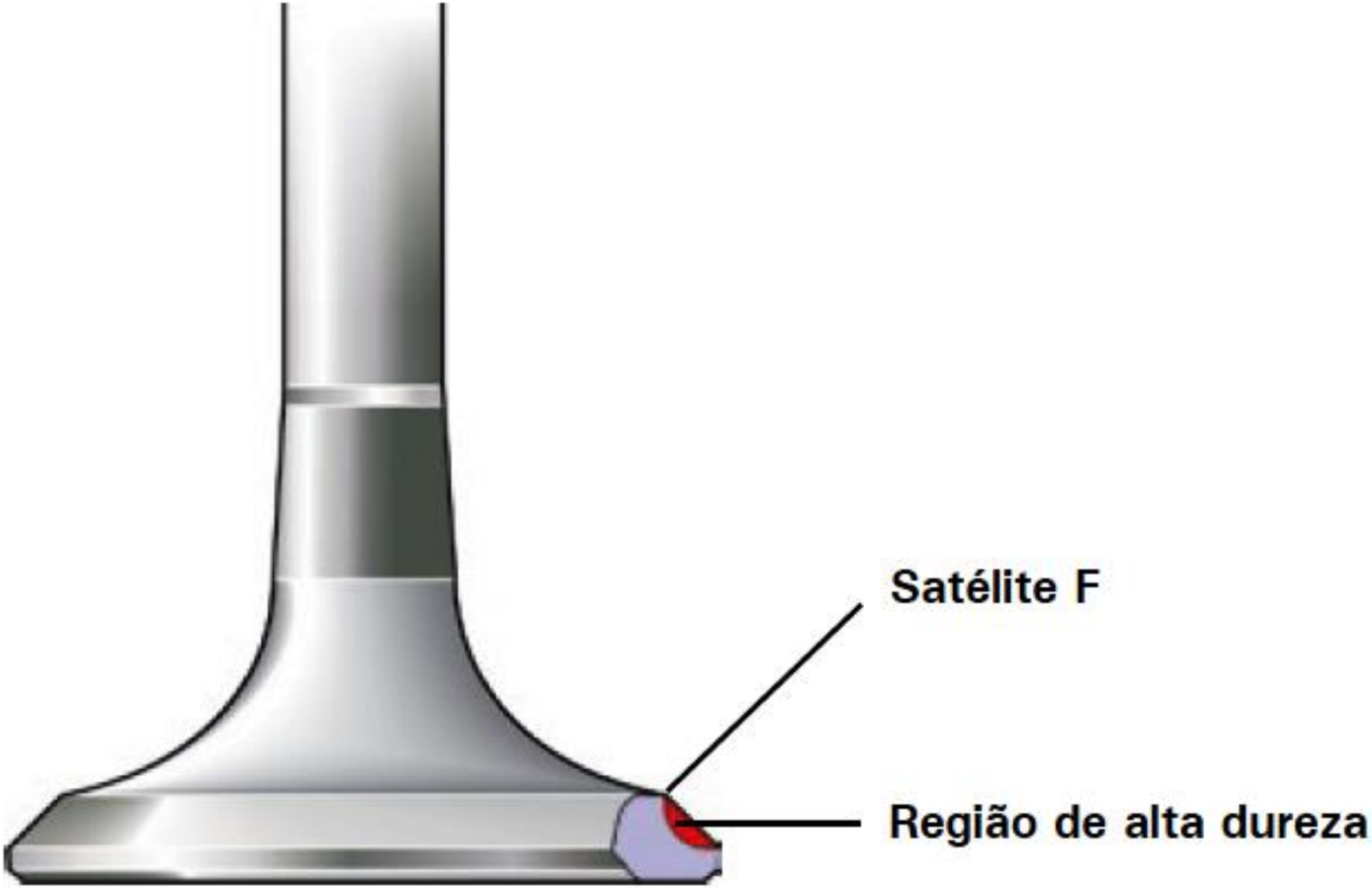
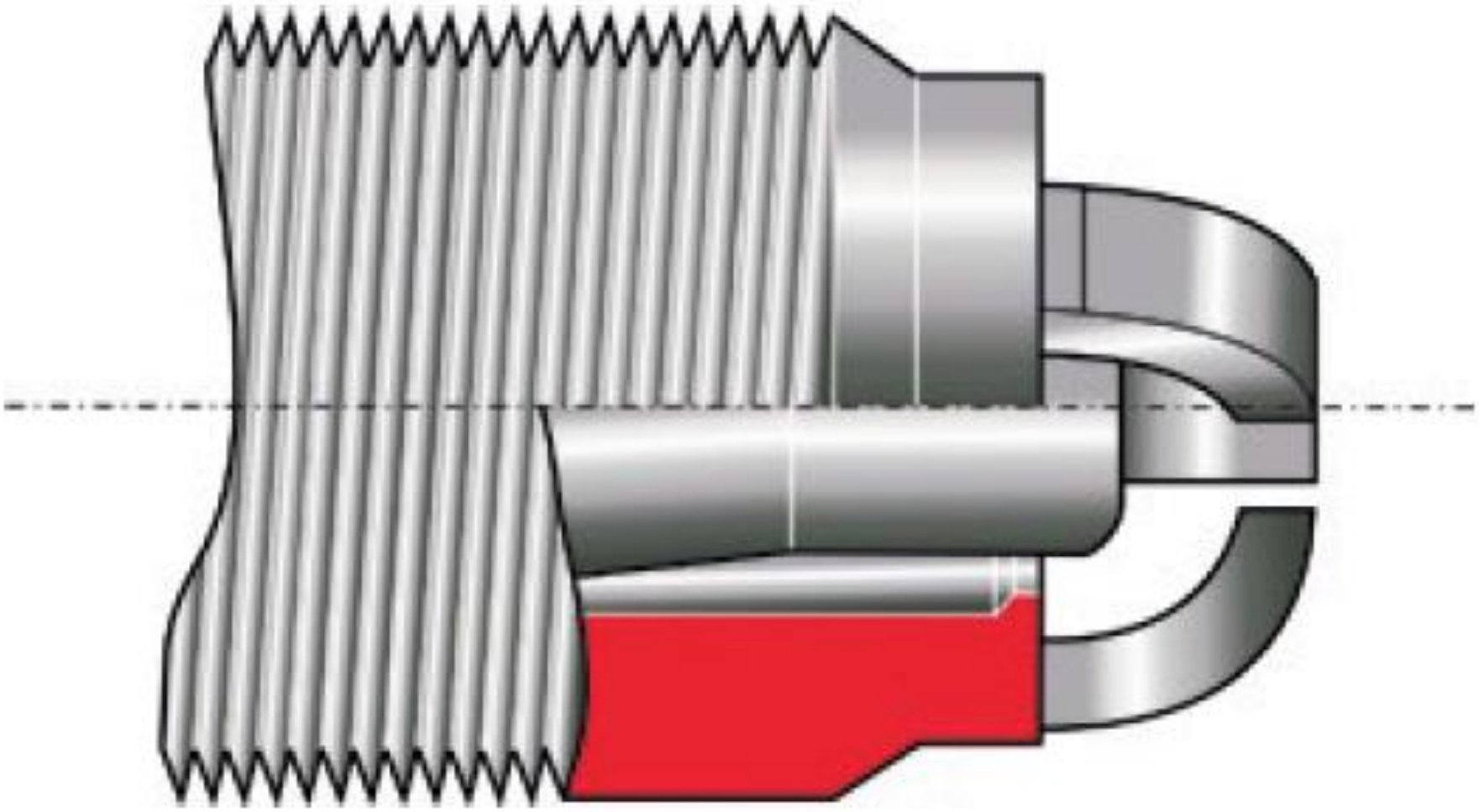
D – Comutador de ignição
J623 – Unidade de Controle do Motor
J65 – Unidade de Controle para aquecimento
Z66, Z108, Z109, Z110 – resistências 1, 2, 3 e 4 para pré-aquecimento do combustível
S – fusível

K11 – Luz indicadora para aquecimento
J285 – Unidade de Controle do Instrumento Combinado

O sinal de ativação da UCA proveniente da UCM é PWM.

Legenda de cores

- Positivo
- Massa
- Sinal de entrada
- Sinal de saída
- CAN Bus
- Sinal bidirecional


Satélite F
Região de alta dureza