AUTOMOTIVE CURRENT TRANSDUCER
HAB 80-S

Introduction

The HAB Family is best suited for DC, AC or pulsed-current measurements in high-power and low-voltage automotive applications. It's contains galvanic isolation between the primary circuit (high power) and the secondary circuit (electronic circuit).

The HAB family gives you a choice of having different current measuring ranges in the same housing (from ± 20 A up to ± 100 A).

Features

- Open Loop transducer using the Hall effect sensor
- Low voltage application
- Unipolar + 5 V DC power supply
- Primary current measuring range ± 80 A
- Maximum RMS primary current limited by the busbar, the magnetic core or the ASIC temperature T° < + 150°C
- Operating temperature range: - 40°C < T° < + 125°C.

Advantages

- Good accuracy for high and low current range
- Good linearity
- Low thermal offset drift
- Low thermal gain drift
- Hermetic package.

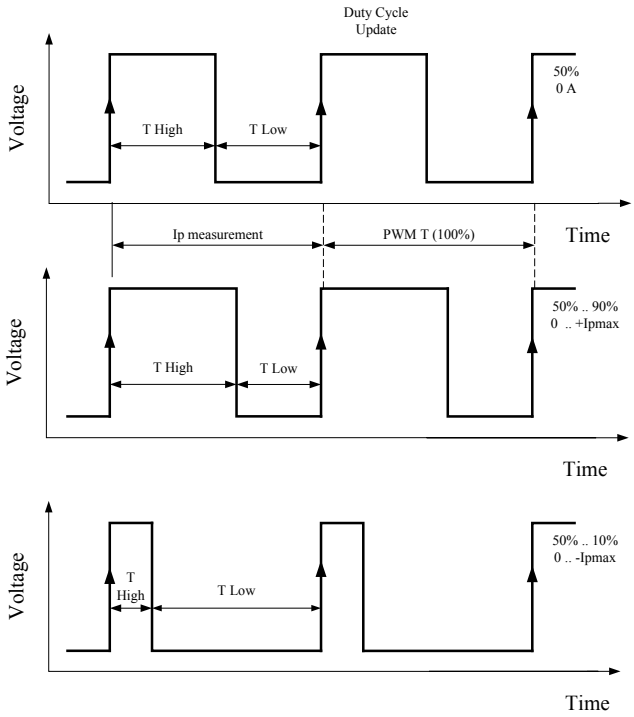
Automotive applications

- Battery Pack Monitoring
- Hybrid Vehicles
- EV and Utility Vehicles.

Principle of HAB xxx-S Family

The transducer uses open loop Hall effect technology. It provides a **P**ulse **W**idth **M**odulated output Signal proportional to the magnetic Induction B generated by the primary current I_P to be measured.

The **PWM** principle is described as follow:



$$PWM\ period\ \ T_{Period} = T_{High} + T_{Low}$$

$$PWM\ frequency = \frac{1}{T_{Period}} = 125\,Hz$$

$$\text{DutyCycle}(\%) = \frac{T_{High}}{T_{Period}} \times 100$$

$$\text{DutyCycle}(\%) = 50\% + G \times I_P \text{ with G = Sensitivity (\%/A)}$$

The **PWM** period T_{period} starts on the falling edge of the output signal. The ouput signal of the duty cycle given during the T_{period} is the image of the primary current during the T_{period} -1 period.

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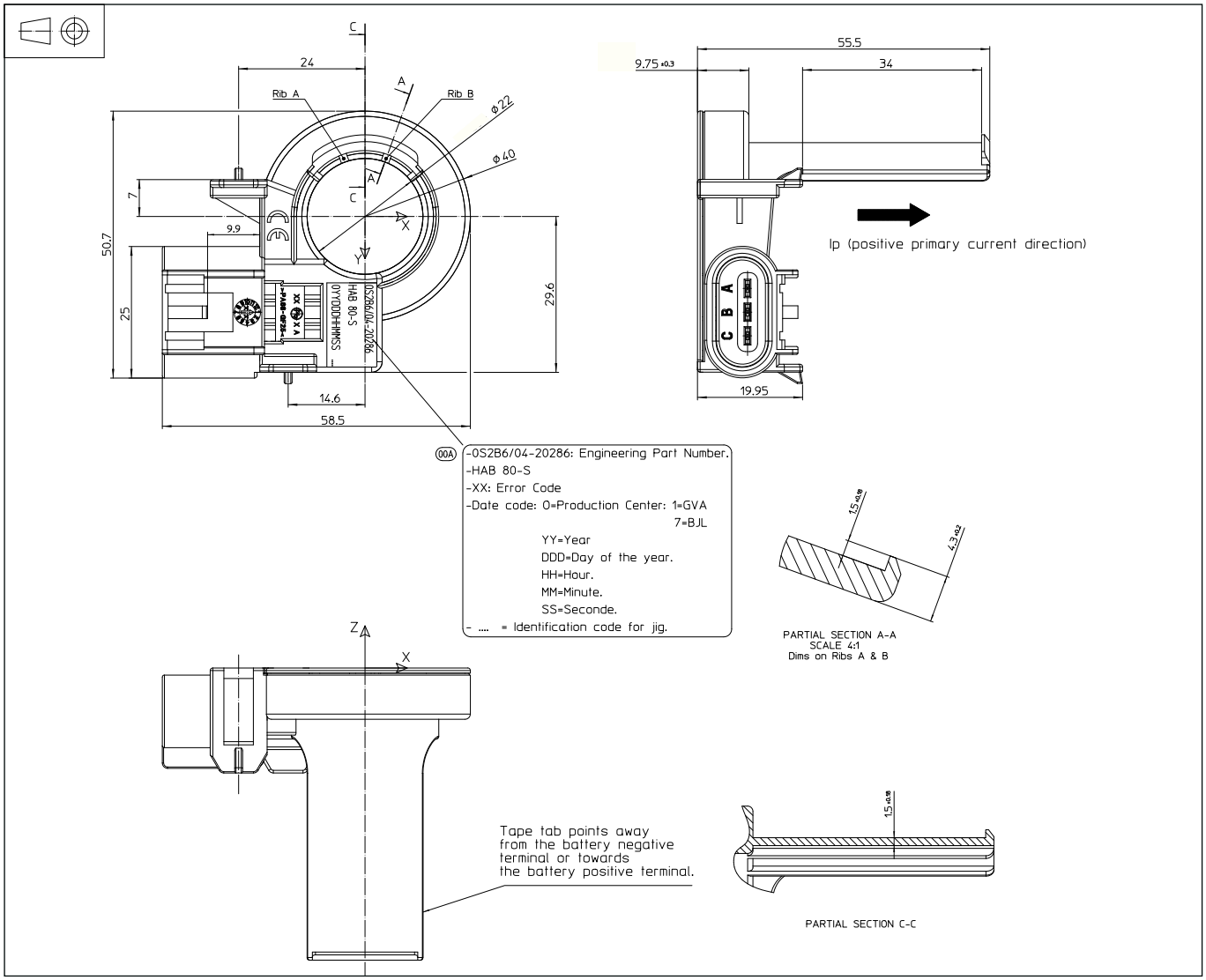
Dimensions HAB 80-S family (in mm)

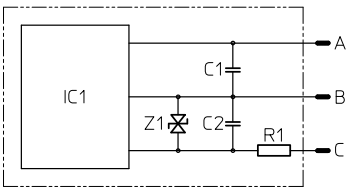


Bill of materials

- Plastic case PA 66-GF25
- Pins Brass tin plated
- ***m*** 25 g

Ip (A)		PWM output signal (%)
+ 80	↑	90
0		50
- 80		10

System architecture



Components list	
IC1	Hall sensor ASIC
C1	100nF-±10%-X7R
C2	10nF-±10%-X7R
R1	51 ohms ±5%
Z1	Bi-directional zener ±12V

Pin out	
A	DC supply voltage (5V)
B	Ground
C	PWM output signal

The optional components are needed if current sensor is outside the control module circuit.

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Absolute maximum ratings (not operating)

PARAMETER	Symbol	Min	Max	Unit
Maximum primary current	I_P		Infinite	A
Supply voltage	V_C	- 8.5	8.5	V
Supply voltage (over voltage t < 1 min)		- 14	14	V
Current consumption (t < 1 min)	I_C		50	mA
Output voltage (t < 1 min)	V_{out}	- 5	14	V
Output voltage over supply voltage	V_{out}-V_C		2	V
Output current	I_{out}	- 10	10	mA
Output short-circuit duration	T_c		10	min
Ambiant storage temperature	T_S	- 40	125	°C

Operating conditions

PARAMETER	Symbol	Min	Typical	Max	Unit
Supply voltage	V_C	4.5	5.00	5.5	V
Supply voltage (accurate range)	V_C	4.75	5.00	5.25	V
Pull up load resistor	R_L	2.2	4.7		KΩ
Capacitive loading	C_L			1	nF
Ambient operation temperature	T_A	- 40	25	125	°C
Ambient operation temperature (accurate range)	T_A	- 10	25	65	°C

Operating characteristics

PARAMETER	Symbol	Min	Typical	Max	Unit
Primary current nominal range	I_{PN}	-80		80	A
Maximum current measuring range (clamping)	I_{PM}	-90		90	A
Calibration current	I_{CAL}	-60		60	A
Current consumption	I_C	-	7.5	10	mA
Output PWM frequency	f_{PWM}	105	125	145	Hz
Output duty cycle sensitivity	G		0.5		%/A
Output duty cycle @ I_P = 0	D_{OUT}		50		%
Output duty clamping low		4	5	6	%
Output duty clamping high		94	95	96	%
Duty cycle resolution			0.0125		%
Power-up time to reach valid duty cycle				25	ms
Setting time after over load				25	ms
Output voltage high (pull up = 4.7 KΩ)	V_{OUTH}	V_C -0.2			V
Output voltage low (pull up = 4.7 KΩ)	V_{OUTL}			0.2	V
Output internal resistance	R_{out}		50	100	Ω
Ouput PWM rise time	t_{rise}			10	µs
Ouput PWM fall time	t_{fall}			10	µs

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Operating temperature

PARAMETER	Symbol	Min	Typical	Max	Unit
Electric offset current @ accurate temperature range	I_{OE}	-0.2	± 0.075	0.2	A
Electric offset current @ full temperature range		-0.3	± 0.15	0.3	A
Magnetic offset current	I_{OM}		± 0.05		A
Output resolution			0.04		A
Sensitivity error @ accurate temperature range	ε_G	-2		2	%
Sensitivity error @ full temperature range		-3		3	%
Linearity error @ 25°C	ε_L	-1		1	%