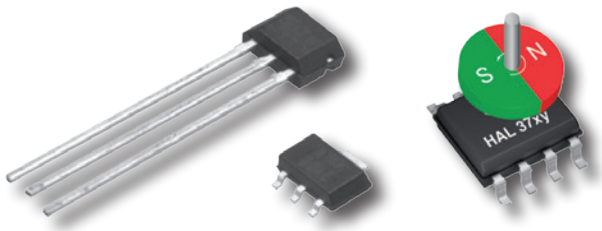


HALL-EFFECT SENSORS – SELECTION GUIDE FOR AUTOMOTIVE APPLICATIONS



Micronas offers a variety of Hall sensors for automotive and industrial applications.

In automotive electronics, Micronas is focusing on sensor systems for a wide range of applications. They require on one hand rather simple Hall switches to detect a position and on the other hand quite complex linear Hall-effect sensors for the measurement of distances or rotational movements.

Below you'll find the selection guide of linear and multi-axis hall-effect sensors for automotive applications.

1. SELECTION BY APPLICATION

		Recommended Solution	Comment	Alternative
Accelerator Pedal		HAL 835	Smallest error by pedal idle position (0°)	HAL 3725
Adaptive Frontlight System		HAL 835	High immunity against temperature variation	–
Adaptive Suspension System / Chassis Position		HAL 3715	Flexible and easy assembly thanks to Modulo 90 feature	HAL 2850
Brake Pedal Position		HAL 2455	Smallest error for small angles or linear movement / with digital output / version with redundancy function available soon	HAL 3736/ HAL 3737
Clutch Cylinder		HAL 37xy	Application requires measurement of 40 mm movement, highest accuracy achievable with HAL 37xy	HAL 855
EGR / Cut-Off Valve / Waste Gate Actuator		HAL 37xy	1% full-scale error required by application	HAL 835
Fuel Level Detection		HAL 835	Price-sensitive application & analog output standard interface for this application	HAL 3725
Gear Shift Selector		HAL 37xy	Usual angular range is above 120°, highest accuracy achievable with HAL 37xy	HAL 2425
Steering Angle		HAL 3735	360° application & digital output	–
Steering Torque		HAL 283x	Small-angle application & SENT protocol / version with redundancy function available soon	–
Throttle Position		HAL 37xy	Highest angle accuracy for 120° & simple magnetic circuit	HAL 83x
Transmission	Neutral Detection Sensor	HAL 835	High temperature stability and output signal flexibility (analog and PWM)	HAL 24xy
	Dual-Clutch Transmission Position with Integrated ECU	HAL 18xy	All compensation (sensitivity / offset, etc.) will be done by ECU software. Low-end linear sensor is required.	HAL 83x
	Dual-Clutch Transmission Position without Integrated ECU	HAL 373x	Application requires measurement of 40 mm movement, highest accuracy achievable with HAL 37xy	HAL 387x
	Transmission Range Sensor	HAL 373x	Application requires measurement of 40 mm movement, highest accuracy achievable with HAL 37xy	HAL 387x
Neutral Gear Position		HAL 373x	2D required, because usual detection angle is >180°. Next step will be full gear detection.	HAL 835
Turbo Charger Actuator		HAL 37xy	1% full-scale error required by application	HAL 835

HALL-EFFECT SENSORS – SELECTION GUIDE FOR AUTOMOTIVE APPLICATIONS

2. SELECTION OF SENSOR TYPE

	PRODUCT FAMILY	PRODUCT TYPE	FIELD COMPONENT	SETPOINTS	LINEAR MEASUREMENT			PACKAGE	OUTPUT				
					End of Shaft	Off-Axis			Leaded	SMD	Analog	PWM	Sent SAE J 2716V 2010
						up to 60°	up to 180°		up to 360°				
HAL 8xy	HAL 830	Z	2	•	•	•		T092UT		•			
	HAL 835	Z	2	•		•				•	•		
	HAL 85x ¹⁾	Z	32	•		•					•		
HAL 18xy	HAL 1820	Z	2	•		•		T092UA	SOT89	•			
HAL 24xy	HAL 2420	Z	2	•		•		T092UT	SOIC8	•			
	HAL 2425	Z	16	•		•				•			
	HAL 2455	Z	16	•		•					•		
HAL 28xy	HAL 283x	Z	2	•		•		T092UT				•	
	HAL 2850	Z	2	•		•					•		
HAL 36xy	HAL 3625	X-Y	32		•			T092UP	SOIC8	•			
	HAL 3675	X-Y	32		•						•		
HAL 37xy	HAL 3725	X-Y	33		•			T092UP	SOIC8	•			
	HAL 3726	X-Z	33	•			•			•			
	HAL 3727	X-Z	33	•			•			•			
	HAL 3735	X-Y	33		•						•	•	
	HAL 3736	Y-Z	33	•			•				•	•	
	HAL 3737	X-Z	33	•			•				•	•	
HAL 38xy	HAL 3855	Y-Z	32	•			•	T092UP	SOIC8	•			
	HAL 3856	X-Z	32	•			•			•			
	HAL 3875	Y-Z	32	•			•				•		
	HAL 3876	X-Z	32	•			•				•		

¹⁾ -2-wire version available

License Note

HAL 36xy/38xy use licenses of Fraunhofer Institute for Integrated Circuits IIS

HALL-EFFECT SENSORS – SELECTION GUIDE FOR AUTOMOTIVE APPLICATIONS

3. SELECTION OF MAGNET

End of Shaft	Type	Direct Angle 360°
	HAL 36xy HAL 3725 HAL 3735	D= 10, H=2.5, Z=4 NL <±0.25% RT

Off-Axis	Type	Angle	Magnet
	HAL 8xy	<70°	D=15, H=6, Z=2.5 NL <±1% RT
	HAL 24xy	<180°	D=15, H=6, Z=2.5 NL <±0.15% RT
	HAL 38xy HAL 37x6 HAL 37x7	360°	D=15, H=6, Z=2.5 NL <±0.15% RT

Parallel	Type	12 mm Distance	20 mm Distance	40 mm Distance
	HAL 8xy	D=8, H=26, Z=4 NL <±1% RT	D=8, H=43, Z=4 NL <±1% RT	D=8, H=86, Z=4 NL <±1% RT
	HAL 24xy	D=8, H=12, Z=4 NL <±0.15% RT	D=8, H=20, Z=4 NL <±0.15% RT	D=8, H=40, Z=4 NL <±0.15% RT
	HAL 38xy HAL 37x6 HAL 37x7	D=6, H=4, Z=4 NL <±0.15% RT	D=12, H=4, Z=4 NL <±0.15% RT	D=16, H=8, Z=4 NL <±0.15% RT

Orthogonal	Type	12 mm Distance	20 mm Distance	40 mm Distance
	HAL 8xy	D=31, H=6, Z=4 NL <±1% RT	D=52, H=6, Z=4 NL <±1% RT	D=103, H=6, Z=4 NL <±1% RT
	HAL 24xy	D=12, H=6, Z=4 NL <±0.2% RT	D=20, H=6, Z=4 NL <±0.2% RT	D=40, H=6, Z=4 NL <±0.2% RT
	HAL 38xy HAL 37x6 HAL 37x7	D=6, H=3, Z=4 NL <±0.2% RT	D=20, H=6, Z=4 NL <±0.2% RT	D=25, H=6, Z=4 NL <±0.2% RT

Magnets SmCo, NeFeB, AlNiCo – Br = 900 mT ... 1300 mT

All dimensions are given in mm.

D: Diameter, H: Height, Z: Distance between magnet and Hall sensor,

NL: Non-linearity, RT: Room temperature

4. PROGRAMMING-TOOLS

Programming-Tools for all programmable hall-effect sensors are available. Please contact us for more information!