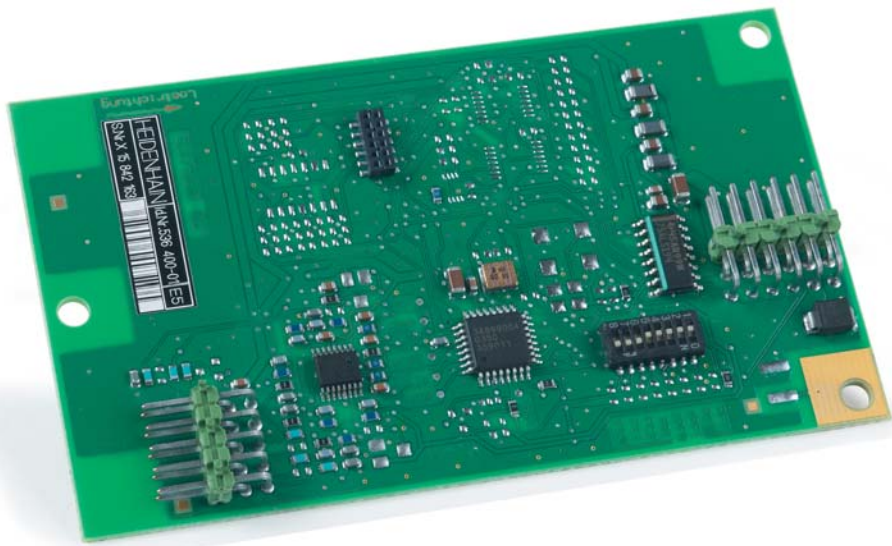




HEIDENHAIN



Product Information

IDP 100 Series

Interpolation and
Digitizing Electronics

February 2006

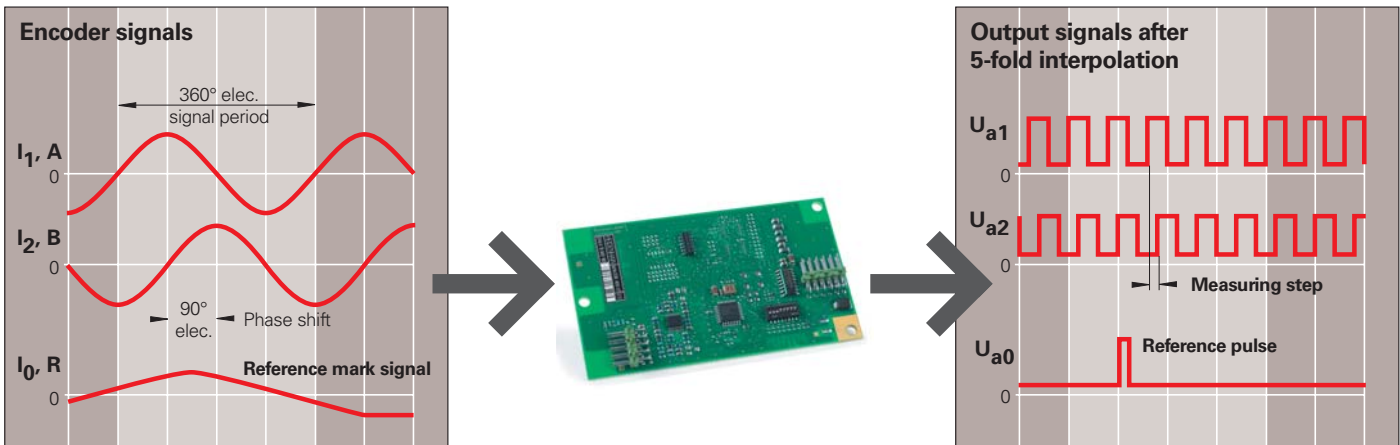
IDP 101/IDP 181/IDP 182

Interpolation and Digitizing Electronics

HEIDENHAIN linear, rotary and angle encoders operate on the principle of photo-electrically scanning very fine gratings. These encoders normally produce sinusoidal scanning signals with levels of approximately $11 \mu\text{A}_{\text{PP}}$ (current signals) or approx. 1V_{PP} (voltage signals). The subsequent electronics first interpolate the scanning signals and then convert them into square-wave pulses (digitizing). The interpolation and digitizing circuitry is either integrated in the NC control (e.g. a HEIDENHAIN TNC) or in the numerical display (e.g. ND or POSITIP from HEIDENHAIN), or is available as a separate unit: **IDP 18x** (for voltage signals A, B and R) or **IDP 101** (for current signals I_1 , I_2 and I_0).

The IDP provides two square-wave pulse trains (U_{a1} and U_{a2}) and a reference pulse U_{a0} as output signals. Within one signal period, each of the four signal edges of U_{a1} and U_{a2} can serve as a counting pulse. The distance between two subsequent edges of U_{a1} and U_{a2} is one measuring step. After 5-fold interpolation, for example, this distance is $1/20$ th of a grating period.

The adjustment to the subsequent electronics is quite easy. The interpolation, edge separation and reference pulse width are adjusted using PCB switches. Failure indication consists of a separate fault detection signal, or in addition, a switch to high impedance in the outputs U_{a1} and U_{a2} .



IDP 181/IDP 182 interpolation and digitizing electronics

Input:  1 V_{PP}
 Output:  TTL

The IDP 18x series features one input for incremental linear or angle encoders with sinusoidal output signals and a signal level of 1 V_{PP}. The IDPs provide TTL-compatible square-wave output signals.



The 5 V ± 5 % power supply must be provided by the subsequent electronics.

Interpolation and minimum edge separation *a* of the output signals or the resulting maximum input frequency are adjustable in the IDP. The hysteresis of the incremental output signals of the IDP 181 is fixed at “no hysteresis;” the IDP 182 is fixed at “with hysteresis.”

	Possible settings						Minimum edge separation <i>a</i>
	IDP 181		IDP 182				
Interpolation	5-fold	10-fold	20-fold	25-fold	50-fold	100-fold	
Input frequency	200 kHz	200 kHz	100 kHz	80 kHz	40 kHz	20 kHz	0.100 μs
	200 kHz	100 kHz	50 kHz	40 kHz	20 kHz	10 kHz	0.220 μs
	133 kHz	66 kHz	33 kHz	26 kHz	13 kHz	6.6 kHz	0.345 μs
	100 kHz	50 kHz	25 kHz	20 kHz	10 kHz	5 kHz	0.465 μs
	80 kHz	40 kHz	20 kHz	16 kHz	8 kHz	4 kHz	0.585 μs
	50 kHz	25 kHz	12.5 kHz	10 kHz	5 kHz	2.5 kHz	0.950 μs
	25 kHz	12.5 kHz	6.25 kHz	5 kHz	2.5 kHz	1.25 kHz	1.925 μs
Reference pulse width	90° elec. or 270° elec.						
Fault indication	Via fault detection signal U_{aS} , or additionally U _{a1} /U _{a2} at high-impedance						

Default values are printed bold.

IDP 101 interpolation and digitizing electronics

Input:  11 μA_{PP}
 Output:  TTL

The IDP 101 series features one input for incremental linear or angle encoders with sinusoidal output signals and a signal level of 11 μA_{PP}. This IDP provides TTL-compatible square-wave output signals.

The 5 V ± 5 % power supply must be provided by the subsequent electronics.

Interpolation and minimum edge separation *a* of the output signals or the resulting maximum input frequency are adjustable in the IDP. The hysteresis of the incremental output signals of the IDP 101 is fixed at “no hysteresis.”

	Possible settings		Minimum edge separation <i>a</i>
	IDP 101		
Interpolation	5-fold	10-fold	
Input frequency	50 kHz	25 kHz	0.950 μs
	25 kHz	12.5 kHz	1.925 μs
Reference pulse width	90° elec. or 270° elec.		
Fault indication	Via fault detection signal U_{aS} , or additionally U _{a1} /U _{a2} at high-impedance		

Default values are printed bold.

Specifications and Dimensions

General specifications	IDP 101	IDP 181	IDP 182
Power supply	5V ± 5%		
Current consumption ¹⁾	≤ 100 mA	≤ 120 mA	≤ 130 mA
Cable length Input	≤ 30 m at I _{Encoder} ≤ 120 mA	≤ 30 m at I _{Encoder} ≤ 120 mA ≤ 60 m at U _P > 4.9 V	
Output	≤ 50 m with HEIDENHAIN cable and differential line receiver at the subsequent electronics input		
Vibration 55 to 2000 Hz Shock 6 ms	≤ 20 m/s ² ≤ 300 m/s ²		
Operating temperature Storage temperature	0 to 70 °C -30 to 80 °C		
Protection IEC 60529	IP 00		
Weight	Approx. 0.1 kg		

Caution:

The permitted limits for the power supply of the connected encoder must not be exceeded.

¹⁾Without current consumption by the encoder and without output load:

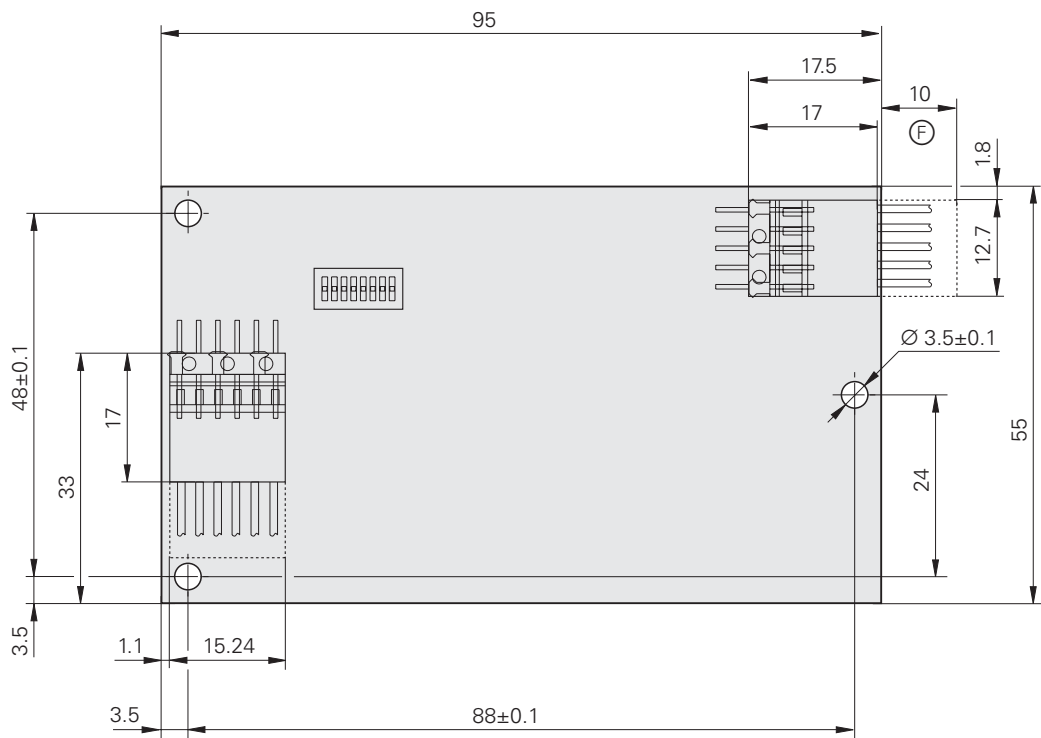
Subsequent electronics with the recommended input circuitry increase current consumption by approx. 80 mA

Dimensions in mm



Tolerancing ISO 8015
ISO 2768 - m H
< 6 mm: ±0.2 mm


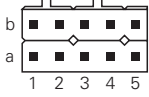






⊕ = Space needed for mounting




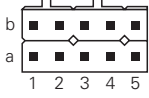


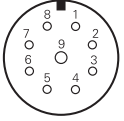



Electrical Connection

Pin Layout


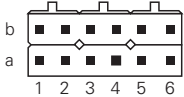


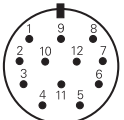



Input for IDP 181/IDP 182

10-pin PCB connector					12-pin M23 flange socket							
												
	Power supply				Incremental signals						Other signals	
	1b	2b	1a	2a	5b	5a	4b	4a	3b	3a	/	/
	12	2	10	11	5	6	8	1	3	4	7	9
	U _P	Sensor U _P	0V	Sensor 0V	A+	A-	B+	B-	R+	R-	Vacant	Vacant
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	/	/

Input for IDP 101

10-pin PCB connector					12-pin M23 flange socket						
											
	Power supply				Incremental signals						
	1b	2b	/	1a	5b	5a	4b	4a	3b	3a	2a
	3	4	Housing	9	1	2	5	6	7	8	/
	U _P	0V	External shield	Inside shield	I ₁₊	I ₁₋	I ₂₊	I ₂₋	I ₀₊	I ₀₋	Vacant
	Brown	White	/	White/ Brown	Green	Yellow	Blue	Red	Gray	Pink	/

Output

12-pin PCB connector					12-pin M23 flange socket								
													
	Power supply				Incremental signals						Other signals		
	2a	2b	1a	1b	6b	6a	5b	5a	4b	4a	3a	3b	/
	12	2	10	11	5	6	8	1	3	4	7	/	9
	U _P	Sensor U _P	0V	Sensor 0V	U _{a1}	\overline{U}_{a1}	U _{a2}	\overline{U}_{a2}	U _{a0}	\overline{U}_{a0}	\overline{U}_{aS}	U _{aS}	Vacant
	Brown/ Green	Blue	White/ Green	White	Brown	Green	Gray	Pink	Red	Black	Violet	/	/

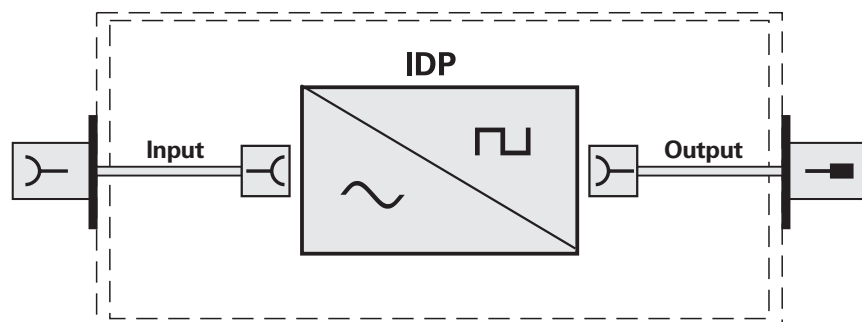
Shield is on housing; **U_P** = power supply

Sensor: The sensor line is connected in the encoder with the corresponding power line.

Vacant pins or wires must not be used!

Color assignment applies only to extension cable.

Connecting Elements and Cables



Input

IDP 18x input assembly

Wired with 12-pin flange socket (female)
and 10-pin PCB connector
Length: 70 mm
Id. Nr. 297051-08

IDP 101 input assembly

Wired with 9-pin flange socket (female)
and 10-pin PCB connector

Length	Id. Nr.
70 mm	298071-02
110 mm	298071-09
150 mm	298071-10

Output

IDP output assembly

Wired with 12-pin flange socket (male)
and 12-pin PCB connector
Length: 70 mm
Id. Nr. 297051-01

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