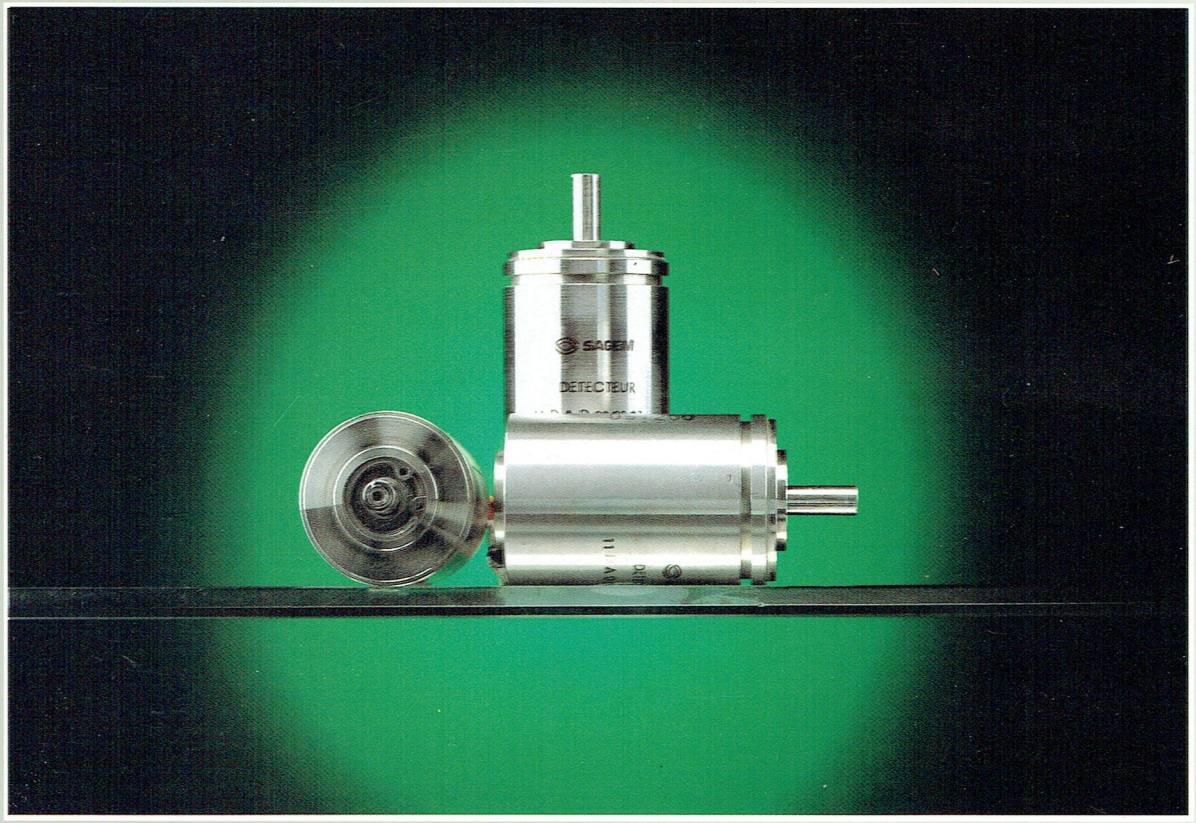
Angular Detectors and Differential Angular Detectors

RVT-RVDT



- *HIGH ACCURACY*
- *RELIABILITY*
- *LIFE TIME*
- *SMALL SIZE*

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Operating Principles

Rotary Variable Transformers are induction type components. These transducers convert the input shaft rotation angle into a proportional variation of one or two output alternative voltages amplitudes.

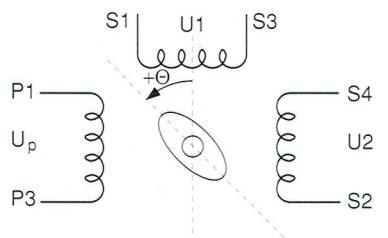
The rotor is made of magnetic material and has no winding. Useful voltages are induced in the secondary windings and are linearly proportional to input rotation angle. All windings are located on the stator.

The single-winding configuration corresponds to a RVT (Rotary Variable Transformer) detector type. The two-winding configuration corresponds to a RVDT (Rotary Variable Differential Transformer) detector type. This last configuration associated with the computation of the sum and difference of the secondary signals allows the sensor to be less sensitive to temperature and input voltage variations, and enables an efficient detection of possible defects.

These detectors have an operating angular range of ± 35° or ± 40°.

Electrical Interface

RVDT type (DAD)



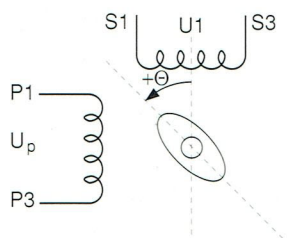
P1*	Red/White
P3	Black/White
S1*	Red
S2	Yellow
S3	Black
S4*	Blue

* Hot spot : in phase signals

RVT type (DA)

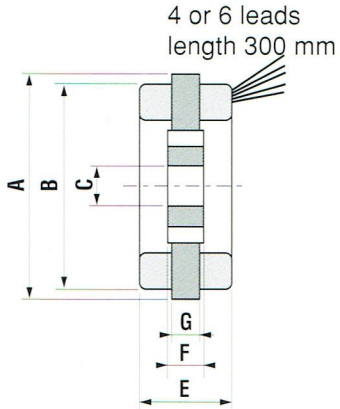
P1*	Red
P3	Green
S1	Yellow
S3	Brown

* Hot spot : in phase signals for θ > 0

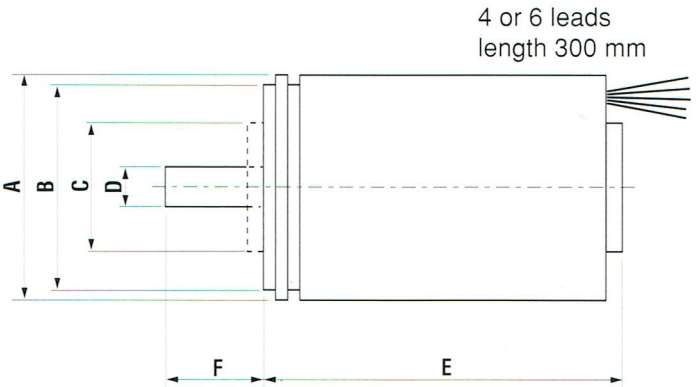


(+θ) : output shaft view for a housed sensor; opposite view to leads for a frameless version

Mechanical Interface



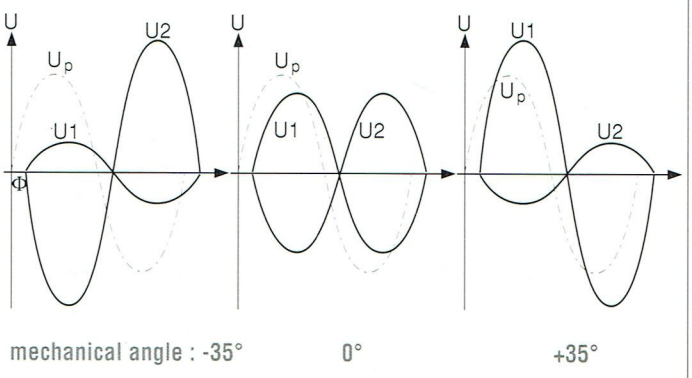
DRAWING 1



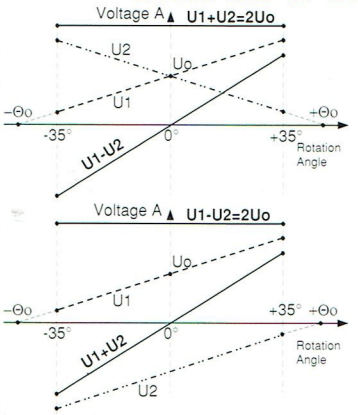
DRAWING 2

Electrical characteristics of a DAD type sensor

SIGNALS TYPE



EXAMPLES OF UTILIZATIONS



square voltage
U1 = kUp13 (θ + θo)
U2 = kUp13 (θo - θ)
U1 - U2 = 2kUp13 θ

U1-U2 = Kθ

phase demodulation
U1 = kUp13 (θ + θo)
U2 = kUp13 (θ - θo)
U1 + U2 = 2kUp13 θ

U1+U2 = Kθ

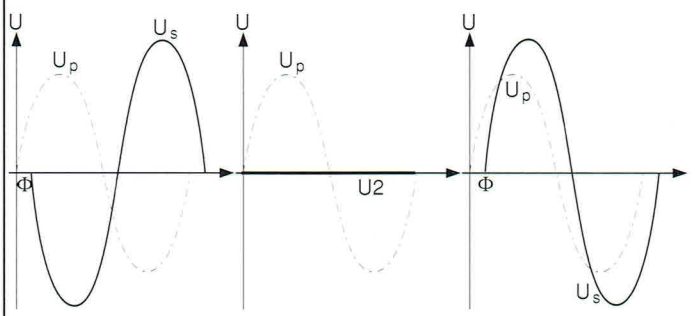
CHARACTERISTICS

TYPE	units	11DAD 02 02 07	11DAD 05 02 07	11DAD 04 01 08	11DAD 50 01 09 (1)	11DAD 06 01 08	10DAD 01 01 00 (2)
Useful Angular Range (±θ max)	degree	± 35	± 35	± 35	± 35	± 40	± 40
Frequency	Hz	400	400	1953	3000	10 000	10 000
Input Voltage	V	26	26	7	7	4	4
Input Current	mA	35	35	6	10	3,5	3,5
Primary Rcc		210	210	163	63	93	93
Secondary Rcc		4,6	4,6	137	53	79	79
Primary impedance Zr0		230+j800	230+j800	230+j1200	135+j935	210+j1250	210+j1250
Secondary impedance Zs0		5+j25	5+j25	160+j600	100+j700	175+j1260	175+j1260
Sensitivity K (3)	mV/°	150	150	150	145	61,5	61,5
Reference Voltage 2Uo	V	6,39	6,39	6,39	8,48	5,47	5,47
Angular shift θo	degree	42,6	42,6	42,6	58,4	88,9	88,9
Accuracy<A+B | θ | (at 20°C)	degree	0,05+0,01θ	0,05+0,01θ	0,05+0,01θ	0,05+0,01θ	0,05+0,01θ	0,05+0,01θ
Weight	g	138	138	95	200	50	15
Rotor inertia	g*cm²	3	2	2	5	0,5	0,5
Friction Torque (max)	cmcN	10	10	10	10	10	-
Mechanical interface	dwg.	2	2	2	2	2	1
Diameter A	mm	27	27	27	28	27	24,6
Diameter B	mm	25,4	25,4	25,4	25,4	25,4	21,8
Diameter C	mm	4,76	4,76	4,76	4,76	4,76	4,76
Diameter D	mm	15,875	-	-	-	-	-
Length E	mm	43	32	32	52	17	10
Length F	mm	14	14	14	16	14	4
Length G	mm	-	-	-	-	-	3
Output leads; AWG	AWG	24	24	24	24	30	30

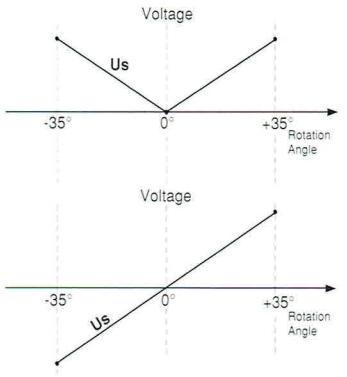
(-) see comments on next sheet

Electrical characteristics of a DA type sensor

SIGNALS TYPE



EXAMPLES OF UTILIZATIONS



CHARACTERISTICS

TYPE		units	10DA 01 01 00 (2) (4)	11DA 01 01 08 (4)				
Useful Angular Range (± θ max)		degree	± 40	± 40				
Frequency		Hz	10 000	10 000				
Input Voltage		V	4	4				
Input Current		mA	3,5	3,5				
Primary Rcc			93	93				
Secondary Rcc			137	137				
Primary impedance	Zr0		210+j1250	210+j1250				
Secondary impedance	Zs0		313+j2520	313+j2520				
Sensitivity	K (3)	mV/°	63,8	63,8				
Accuracy <A+B | θ | (at 20°C)		degree	0,05+0,01θ	0,05+0,01θ				
Weight		g	15	50				
Rotor inertia		g*cm²	0,5	0,5				
Friction Torque (max)		cmcN	-	10				
Mechanical interface		dwg.	1	2				
Diameter	A	mm	24,6	27				
Diameter	B	mm	21,8	25,4				
Diameter	C	mm	4,76	4,76				
Diameter	D	mm	-	-				
Length	E	mm	10	17				
Length	F	mm	4	14				
Length	G	mm	3	-				
Output leads; AWG		AWG	30	30				

(-) see comments on next sheet

Specific Characteristics

MAIN REMARK
Should you require any other type of electrical, mechanical, environmental characteristics, please contact us.

COMMENTS
(1) Double sensor for redundant systems.
(2) Hollow shaft sensor for user mechanical integration.
(3) K: scale factor or sensitivity.
(4) These sensors are also available with a miniaturized integrated electronics which converts them into a C/C Angular Sensors (see SAGEM documentation on brushless angular sensors).

Environment

- Temperature operating range : -55°C to +125°C
- Dielectric Strength :
  250 V - 50 Hz between windings
  500 V - 50 Hz between windings and housing
- Insulation Resistance :
  at 250 VDC between windings and between windings and housing
  from -55°C to +20°C 50 M
  at +125°C 10 M
- Vibrations : according to MIL.STD. 202 F method 204 D test B
- Humidity : according to MIL.STD. 202 F method 106 E
- Altitude : up to 30 000 meters
- Life time : 5000 hours at 1000 RPM (housed sensors)

Codification

11 DAD 02 - 02 - 07

SENSOR SIZE

FUNCTION SYMBOL

DA = Angular Detector
DAD = Differential Angular Detector

MODEL NUMBER

ELECTRICAL NUMBER

SHAFT NUMBER OR MECHANICAL INTERFACE

QUALITY ASSURANCE is SAGEM permanent action

From design to manufacturing SAGEM QA organization guarantees that the customer's requirements are fully satisfied in following areas : specific performances conformity, product reliability, just-in-time delivery.

SAGEM CUSTOMERS are served by a well established world wide commercial, technical and maintenance network.

The Industrial Electronics and Sensors Department also designs and manufactures

- components and electronics devices : Hybrids, Asics, SMD, COB...
- position sensors (synchros, resolvers, brushless angular sensors)
- encoding electronics
- DC motors, stepper motors
- electromechanical assemblies
- ferromagnetics components
- accelerometers,engine speed sensors, temperature sensors, for automotive applications
- pressure sensors for aeronautics and industrial applications,...

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