

3-AXIS INCLINE SENSORS (IP69K)

SINC Incline Sensor *3 axis inclinometer, single module*

- Easy mounting, sense true position regardless orientation
 - 3 axis sensing (X, Y and Z)
- Totally sealed IP69K (*connector dependent*)
- Wide operating temperature range, -40°C to +85°C
- J1939 CAN Bus or varying voltage output
- 'Electronic Bubble' LEDs display level status
- Configuration available through J1939 for sensitivity and angular range settings



STANDARD OPERATING CHARACTERISTICS

ELECTRICAL	Outputs	B - 1939 J1939, Addressable, 3 axis reporting (<i>attached message sheets S4; I2 / 3 - 4</i>)
		B - ANLG Contact Joral to build custom analog signal
	Input Power	6 to 30 VDC (<i>90 mA</i>)
	Electrical Protection	Over-voltage, reserve-voltage, output short-circuit protected
	LED Indicators	Power, J1939 communication status, level status and X/Y level condition
	Connections	M12, M12 Pigtail, Flying Lead Cable, Shielded Flying Lead, or Deutsch - 4 or 6 pin
	Resolution	0.1°
	Absolute Accuracy (at 25°C)	± 0.3°
MECHANICAL	Housing Style	Rectangular tabbed
	Housing Material	Plastic or Anodized Aluminum (<i>high temperature applications</i>)
	Housing Height	Plastic - 1.0"; Aluminum - <i>Contact Joral</i>
	Housing Width	Plastic - 1.5"; Aluminum - <i>Contact Joral</i>
	Housing Length w/ Tabs	Plastic - 3.0"; Aluminum - <i>Contact Joral</i>
	Mounting	Tabs (0.187 diameter holes)
	Weight	3.0 oz
ENVIRONMENTAL	Operating Temperature	-40° to +80° C
	Temperature Drift	± 0.3 degrees across specified operating temperature limits
	Storage Temperature	-40° to +90° C
	Humidity	100%
	Shock	400g/6ms (<i>MIL STD 202</i>)
	Vibration	5 to 3000 Hz, 20g (<i>MIL STD 202</i>)
	Protection Class	IP69K (<i>connection dependent</i>)

SINC GENERAL ORDERING GUIDE

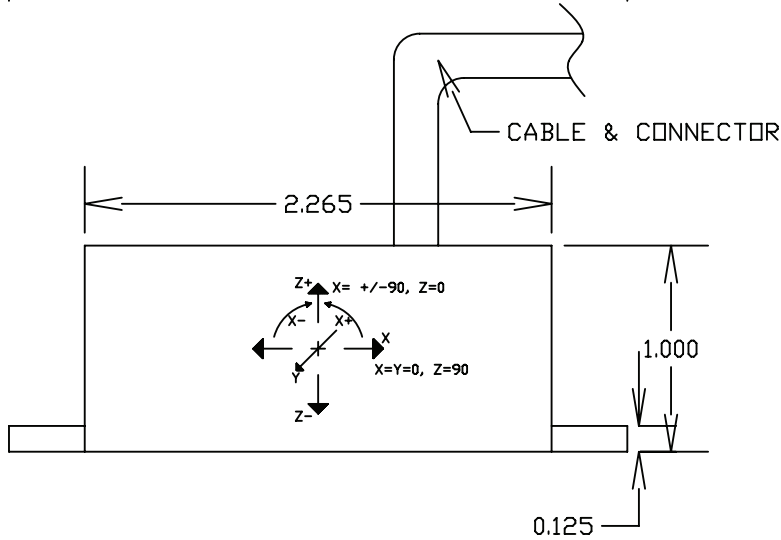
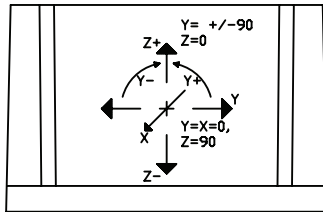
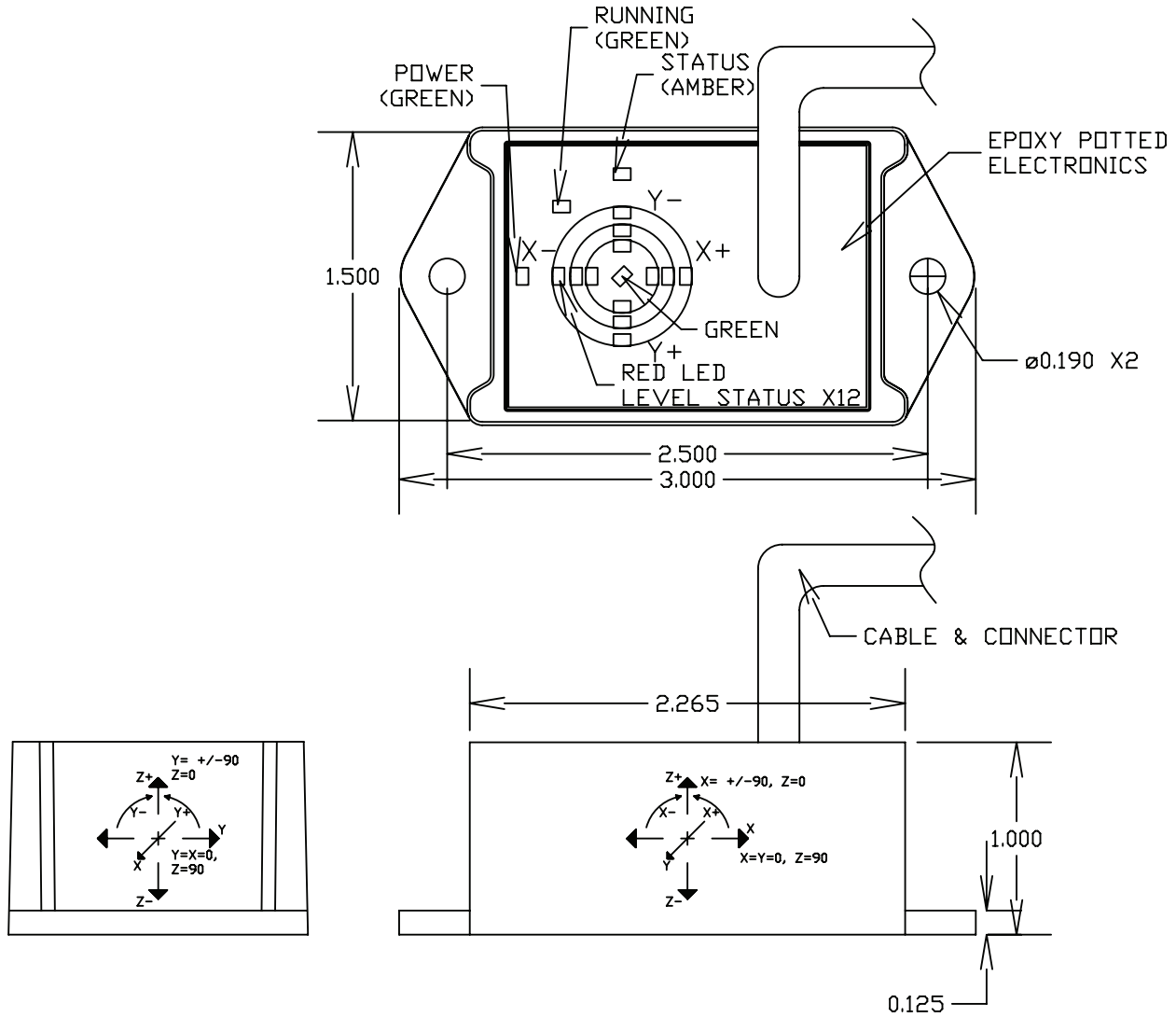
Code 1: Housing Style	Code 2: MagElec (Sensor Output)	Code 3: Connection	Code 4: Special Codes	
SINC Black plastic housing standard, not rated for high temp applications SINC Modifier Red Aluminum: SINC - [Code 2] - [Code 3] - 51 Special code 51(53) for anodized red (black) aluminum high temp housing	B - 1939	J1939, Addressable, 3 axis position reporting	M12 M12 male 51 Red Aluminum	
			M12P M12 male on 18' pigtail 53 Black Aluminum	
	B - ANLG	Contact Joral to build custom analog signal	CXX Flying lead cable (enter XX as inches)	
			SCXX Shielded cable (enter XX as inches)	
			DE4 DT04 - 4 pin male Deutsch	
			DE6 DT04 - 6 pin male Deutsch	
* More outputs and connection options available, contact Joral if desired configuration is not listed				

General dimensions found on next page (S4; I2 / 2)

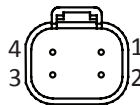
J1939 setting/status message found on pages three and four (S4; I2 / 3 - 4)



SINC DIMENSIONS & GENERAL PIN OUTS



**DT04-4P MALE
FACE VIEW**



DT04-4P J1939 OUTPUT

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = COMMON/GROUND

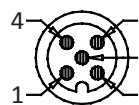
**DT04-6P MALE
FACE VIEW**



DT04-6P J1939 OUTPUT

- 1 = YEL = CAN HIGH
- 2 = GRN = CAN LOW
- 3 = RED = +VDC (VIN)
- 4 = BLK = ADDRESS GROUND
- 5 = WHT = ADDRESS PROG. RESISTOR
- 6 = BLK = COMMON/GROUND

**M12-5P MALE
FACE VIEW**



**M12-5P AND 5 CONDUCTOR
CABLE J1939 OUTPUT**

- 1 = BRN = +VDC (VIN)
- 2 = WHT = CAN HIGH
- 3 = BLUE = COMMON/GROUND
- 4 = BLK = CAN LOW
- 5 = GRY = OPTIONAL ADDRESS PROGRAMMING RESISTOR

*Dimensions informative only
For most recent dimensions please consult factory*



J1939 3 Axis Incline Sensor - STATUS Message 65465 (SINC)

MESSAGE PARAMETERS	
This message is transmitted by sensor at REP Rate	
PGN: 65465 (FFB9 hex)	
Transmission Repetition Rate	50ms
Data Length	8 bytes
Data Page	0
PDU Format	255 (FF hex)
PDU Specific	185 (B9 hex)
Priority	4
Source Address	220 (DBC hex)
Communication Bit Rate	250 K bits/sec

PART NUMBERS	
5 pin M12	SINC-B-1939-M12
4 pin DT04	SINC-B-1939-DE4
6 pin DT04	SINC-B-1939-DE6
Flying Lead	SINC-B-1939-SCXX
<i>For flying lead replace XX with desired length in inches</i>	
<i>For high temperature applications use aluminum housing. Add modifier 51 (red) or 53 (black) to end of Joral P/N for aluminum.</i>	

CONNECTIONS / WIRING			
Signal	M12 5 pin	DE4	DE6
V+	1	3 RED	3 RED
Common	2	4 BLACK	4 BLACK
CANH	3	1 YELLOW	1 YELLOW
CANL	4	2 GREEN	2 GREEN
SA Select	5		5 WHITE
Common			6 BLACK

SOURCE ADDRESS SELECTION		
Value (ohms)	Address	PGN
No Resistor	220	65465
590 (id-tag 1)	221	65465
976 (id-tag 2)	222	65465
1500 (id-tag 3)	223	65465
2260 (id-tag 4)	224	65465
3400 (id-tag 5)	225	65465
5360 (id-tag 6)	226	65465
9530 (id-tag 7)	227	65465

8 BYTE / 64 BIT DATA FIELD BIT POSITIONS				
BYTE	BIT	BIT FUNCTION	FIELD DESCRIPTION	
BYTE 1	1	X Angle bit0 LSB	X ANGLE (10 bits) 0 to 1000, 0.1° per bit	
	2	X Angle bit1		
	3	X Angle bit2		
	4	X Angle bit3		
	5	X Angle bit4		
	6	X Angle bit5		
	7	X Angle bit6		
	8	X Angle bit7		
BYTE 2	9	X Angle bit8	X ANGLE POS SIGN FLAG (2 bits) 01 = Positive Angle	
	10	X Angle bit9 MSB		
	11	X Positive Flag LSB	X ANGLE NEGATIVE SIGN FLAG (2 bits) 01 = Negative Angle	
	12	X Positive Flag MSB		
	13	X Negative Flag LSB	Y ANGLE (10 bits) 0 to 1000, 0.1° per bit	
	14	X Negative Flag MSB		
	15	Y Angle bit0 LSB		
	16	Y Angle bit1		
17	Y Angle bit2			
18	Y Angle bit3			
BYTE 3	19	Y Angle bit4	Y ANGLE POS SIGN FLAG (2 bits) 01 = Positive Angle	
	20	Y Angle bit5		
	21	Y Angle bit6	Y ANGLE NEGATIVE SIGN FLAG (2 bits) 01 = Negative Angle	
	22	Y Angle bit7		
	23	Y Angle bit8	Z ANGLE (10 bits) 0 to 1000, 0.1° per bit	
	24	Y Angle bit9 MSB		
	25	Y Positive Flag LSB		
	26	Y Positive Flag MSB		
27	Y Negative Flag LSB			
28	Y Negative Flag MSB			
BYTE 4	29	Z Angle bit0 LSB	Z ANGLE POS SIGN FLAG (2 bits) 01 = Positive Angle	
	30	Z Angle bit1		
	31	Z Angle bit2	Z ANGLE NEGATIVE SIGN FLAG (2 bits) 01 = Negative Angle	
	32	Z Angle bit3		
	33	Z Angle bit4	Z ANGLE POS SIGN FLAG (2 bits) 01 = Positive Angle	
	34	Z Angle bit5		
	35	Z Angle bit6		
	36	Z Angle bit7		
37	Z Angle bit8			
38	Z Angle bit9 MSB			
BYTE 5	39	Z Positive Flag LSB	Z ANGLE NEGATIVE SIGN FLAG (2 bits) 01 = Negative Angle	
	40	Z Positive Flag MSB		
	41	Z Negative Flag LSB	used	
	42	Z Negative Flag MSB		
	43	unused		
	44	unused		
	45	unused		
	46	unused		
BYTE 6	47	unused	used	
	48	unused		
	49	unused		
	50	unused		
	51	unused		
	52	unused		
	53	unused		
	54	unused		
BYTE 7	55	unused	used	
	56	unused		
	57	Sensitivity bit0 LSB		SENSITIVITY Setting (3 bits) Field contains value of current setting 0 = most sensitive, 7 = most sluggish (default 4)
	58	Sensitivity bit1		
	59	Sensitivity bit2 MSB		LED WEIGHT Setting (3 bits) Field contains value of current setting Degrees per LED Indicator, 1 to 7 (default 1)
	60	LED Weight bit0 LSB		
	61	LED Weight bit1		
	62	LED Weight bit2 MSB		
63	unused			
64	unused			



J1939 3 Axis Incline Sensor - SETTING Message 65281 (SINC)

MESSAGE PARAMETERS

This message is transmitted by the controller

PGN: 65281 (FF01 hex)	
Transmission Repetition Rate	n/a
Data Length	n/a
Data Page	0
PDU Format	255 (FF hex)
PDU Specific	1 (01 hex)
Priority	x
Source Address	39 (27 hex)
Communication Bit Rate	250 K bits/sec

CONNECTIONS / WIRING

Signal	M12 5 pin	DE4	DE6
V+	1	3 RED	3 RED
Common	2	4 BLACK	4 BLACK
CANH	3	1 YELLOW	1 YELLOW
CANL	4	2 GREEN	2 GREEN
SA Select	5		5 WHITE
Common			6 BLACK

SOURCE ADDRESS SELECTION

Value (ohms)	Address	PGN
No Resistor	220	65281
590 (id-tag 1)	221	65282
976 (id-tag 2)	222	65283
1500 (id-tag 3)	223	65284
2260 (id-tag 4)	224	65285
3400 (id-tag 5)	225	65286
5360 (id-tag 6)	226	65287
9530 (id-tag 7)	227	65288

8 BYTE / 64 BIT DATA FIELD BIT POSITIONS

BYTE	BIT	BIT FUNCTION	FIELD DESCRIPTION	
BYTE 1	1	SENS Setting bit0 LSB	SENSITIVITY SETTING (3 bits) <i>Field contains value of current setting</i> 0 = most sensitive, 7 = most sluggish (default 4)	
	2	SENS Setting bit1		
	3	SENS Setting bit2 MSB		
	4	reserved	LED WEIGHT SETTING (3 bits) <i>Field contains value of current setting</i> Degrees per LED indicator, 1 to 7 (default 1)	
	5	reserved		
	6	Direction Setting LSB		
	7	Direction Setting LSB		
	8	Direction Setting MSB		
BYTE 2	9	CAL LSB		CALIBRATE/HOME FLAG (2 bits) 01 = Calibrate / Home the sensor
	10	CAL MSB		
	11	unused		NOTE: Set reserved and unused bits to all 0's or all 1's
	12	unused		
	13	unused		
	14	unused		
	15	unused		
	16	unused		
BYTE 3	17	unused		
	18	unused		
	19	unused		
	20	unused		
	21	unused		
	22	unused		
	23	unused		
	24	unused		
BYTE 4	25	unused		
	26	unused		
	27	unused		
	28	unused		
	29	unused		
	30	unused		
	31	unused		
	32	unused		
BYTE 5	33	unused		
	34	unused		
	35	unused		
	36	unused		
	37	unused		
	38	unused		
	39	unused		
	40	unused		
BYTE 6	41	unused		
	42	unused		
	43	unused		
	44	unused		
	45	unused		
	46	unused		
	47	unused		
	48	unused		
BYTE 7	49	unused		
	50	unused		
	51	unused		
	52	unused		
	53	unused		
	54	unused		
	55	unused		
	56	unused		
BYTE 8	57	unused		
	58	unused		
	59	unused		
	60	unused		
	61	unused		
	62	unused		
	63	unused		
	64	unused		

