



### 3 AXIS INCLINOMETERS GENERAL OVERVIEW

The Joral Inclinometer provides rugged duty incline sensing that supports the standard and reliable CAN bus protocol. The solid state device is fully potted and sealed for IP69K protection.

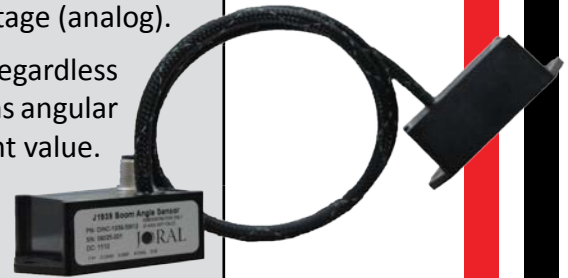
- J1939 CAN Bus or varying voltage output
- Easy mounting, 3 axis sensing detects true change in angle (X, Y, Z) regardless of installed orientation
- Configuration available through J1939 for sensitivity and range settings
- Completely potted and sealed (IP69K)
- Standard connector options available (M12, Deutsch, flying lead)
- 'Electronic Bubble' LEDs display level status

### DINC & SINC APPLICATION OVERVIEW

The Joral 3 axis incline sensor is packaged as a single or dual module which communicates angular position via J1939 CAN Bus or varying voltage (analog).

Solid-state microchip technology allows true position sensing regardless orientation to programmed zero. J1939 standard message contains angular position for X, Y, and Z. Each axis has its own independent current value.

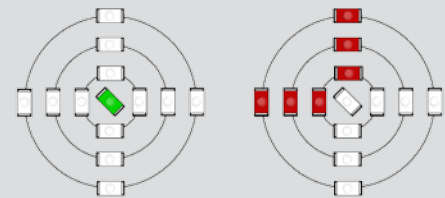
The sensor can be mounted to fit the requirements of the application, installed orientation does not influence output.



### LED LEVEL ELECTRONIC BUBBLE *Real time visual feedback*

Current angle for X and Y axis are displayed on LED indicators to show level and varying degrees out of level.

LED display handy for installation and at a glance level check. Red LEDs display level condition and green LED shows sensor is level.



GREEN "LEVEL" LED

RED X/Y AXIS TILT LEDS

### AT-A-GLANCE SPECIFICATIONS

**Available Outputs:**

- J1939 CAN Bus
- Analog (*voltage across specified range*)

**Part # Single Incline Sensor**  
SINC-B-1939-[connector code]

**Boom Angle Sensor**  
DINC-B-1939-[connector code]

***For Analog incline configuration  
P/N consult Joral factory***

**Connection options include but not limited to:** M12, M12 Pigtail, Flying Lead Cable, and various Deutsch connectors



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

### SINC GENERAL ORDERING GUIDE

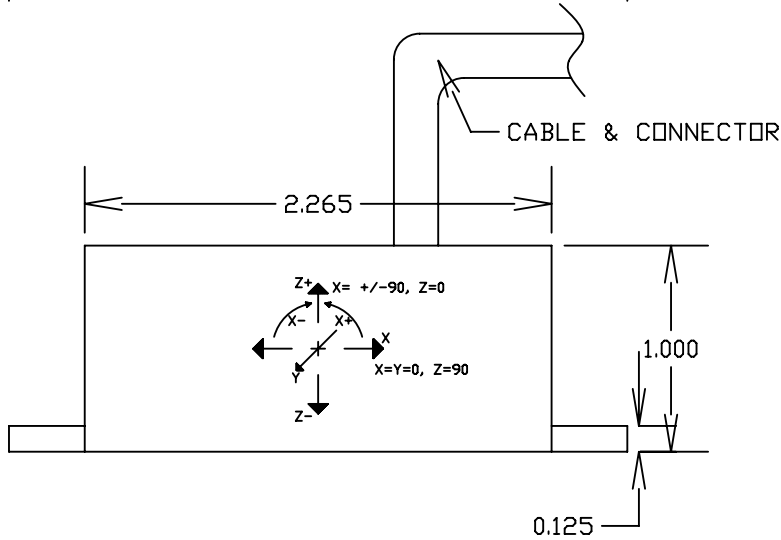
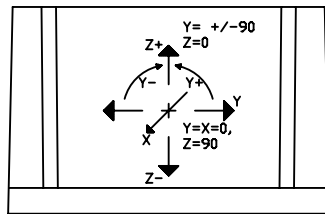
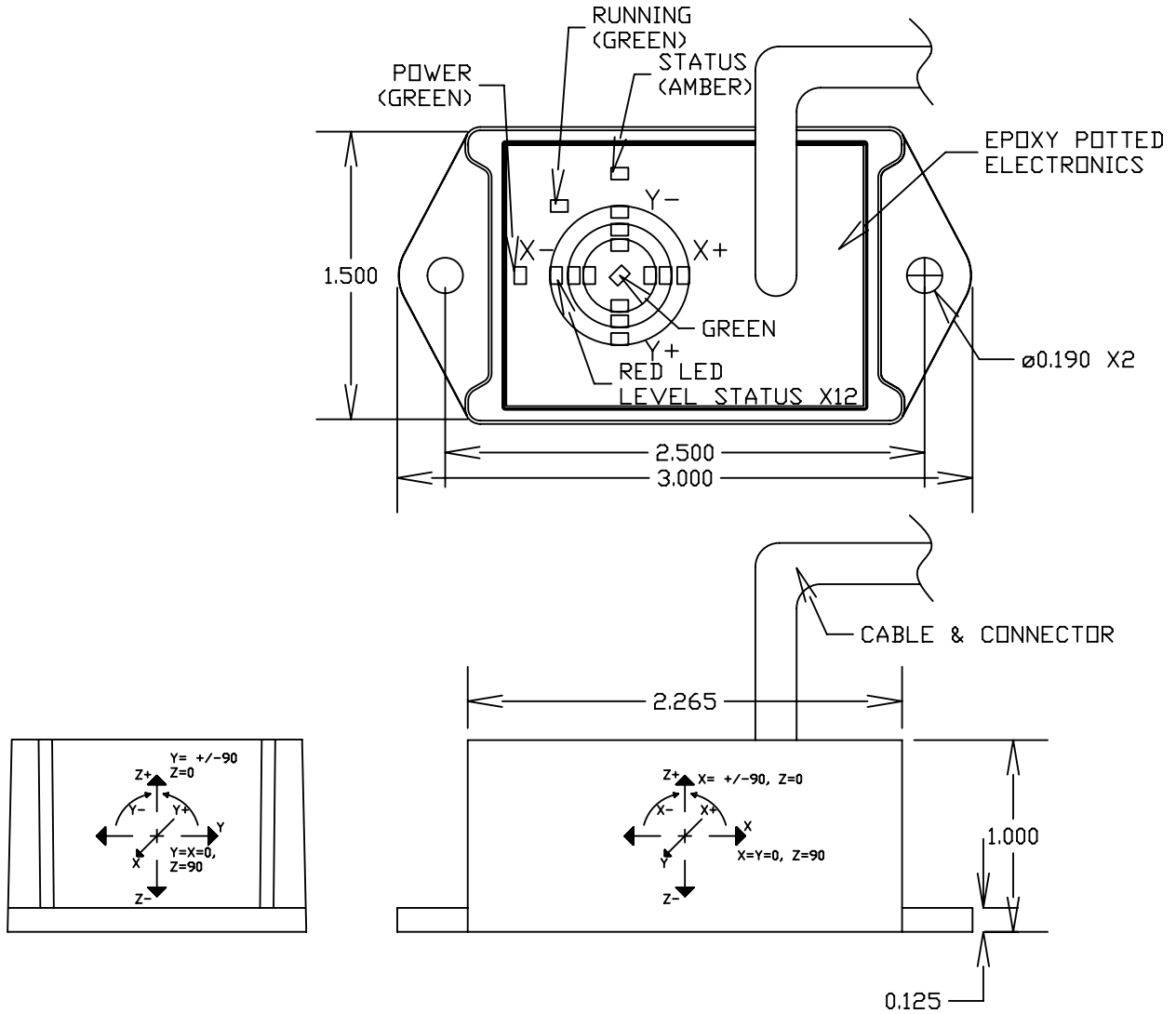
Code 1: Housing Style	Code 2: MagElec (Sensor Output)	Code 3: Connection	Code 4: Special Codes
<b>SINC</b> Black plastic housing standard, not rated for high temp applications	<b>B - 1939</b> J1939, Addressable, 3 axis position reporting	<b>M12</b> M12 male	<b>51</b> Red Aluminum
	<b>B - ANLG</b> Contact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

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

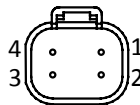
J1939 setting/status message found on pages three and four (S4; I2 / 3 - 4)



**SINC DIMENSIONS & GENERAL PIN OUTS**



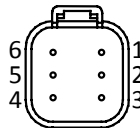
**DT04-4P MALE  
FACE VIEW**



**DT04-4P J1939 OUTPUT**

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

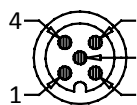
**DT04-6P MALE  
FACE VIEW**



**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

<b>PGN: 65465 (FFB9 hex)</b>	
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	<b>X ANGLE (10 bits)</b> 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	<b>X ANGLE POS SIGN FLAG (2 bits)</b> 01 = Positive Angle	
	10	X Angle bit9 MSB		
	11	X Positive Flag LSB	<b>X ANGLE NEGATIVE SIGN FLAG (2 bits)</b> 01 = Negative Angle	
	12	X Positive Flag MSB		
	13	X Negative Flag LSB	<b>Y ANGLE (10 bits)</b> 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	<b>Y ANGLE POS SIGN FLAG (2 bits)</b> 01 = Positive Angle	
	20	Y Angle bit5		
	21	Y Angle bit6	<b>Y ANGLE NEGATIVE SIGN FLAG (2 bits)</b> 01 = Negative Angle	
	22	Y Angle bit7		
	23	Y Angle bit8	<b>Z ANGLE (10 bits)</b> 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	<b>Z ANGLE POS SIGN FLAG (2 bits)</b> 01 = Positive Angle	
	30	Z Angle bit1		
	31	Z Angle bit2	<b>Z ANGLE NEGATIVE SIGN FLAG (2 bits)</b> 01 = Negative Angle	
	32	Z Angle bit3		
	33	Z Angle bit4	<b>Z ANGLE POS SIGN FLAG (2 bits)</b> 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	<b>Z ANGLE NEGATIVE SIGN FLAG (2 bits)</b> 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		<b>SENSITIVITY Setting (3 bits)</b> Field contains value of current setting 0 = most sensitive, 7 = most sluggish (default 4)
	58	Sensitivity bit1		
	59	Sensitivity bit2 MSB		
	60	LED Weight bit0 LSB		<b>LED WEIGHT Setting (3 bits)</b> Field contains value of current setting Degrees per LED Indicator, 1 to 7 (default 1)
	61	LED Weight bit1		
	62	LED Weight bit2 MSB		
63	unused	used		
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	<b>SENSITIVITY SETTING (3 bits)</b> <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	<b>LED WEIGHT SETTING (3 bits)</b> <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		<b>CALIBRATE/HOME FLAG (2 bits)</b> 01 = Calibrate / Home the sensor
	10	CAL MSB		
	11	unused		<b>NOTE: Set reserved and unused bits to all 0's or all 1's</b>
	12	unused		
	13	unused		
	14	unused		
	15	unused		
	16	unused		
17	unused			
BYTE 3	18	unused		
	19	unused		
	20	unused		
	21	unused		
	22	unused		
	23	unused		
	24	unused		
	25	unused		
BYTE 4	26	unused		
	27	unused		
	28	unused		
	29	unused		
	30	unused		
	31	unused		
	32	unused		
	33	unused		
BYTE 5	34	unused		
	35	unused		
	36	unused		
	37	unused		
	38	unused		
	39	unused		
	40	unused		
	41	unused		
BYTE 6	42	unused		
	43	unused		
	44	unused		
	45	unused		
	46	unused		
	47	unused		
	48	unused		
	49	unused		
BYTE 7	50	unused		
	51	unused		
	52	unused		
	53	unused		
	54	unused		
	55	unused		
	56	unused		
	57	unused		
BYTE 8	58	unused		
	59	unused		
	60	unused		
	61	unused		
	62	unused		
	63	unused		
	64	unused		



**DINC Boom Angle Sensor** *3 axis inclinometer, dual module*

- Two inclinometers which report master and slave position via one J1939 communication line
- Sense true position regardless orientation (X, Y and Z)
  - Easily find change in position between base and boom
- 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>B - 1939</b> J1939, Addressable, 3 axis reporting ( <i>attached message sheets S4; I3 / 3 - 4</i> )
		<b>B - ANLG</b> Contact Joral to build custom analog signal
	<b>Input Power</b>	6 to 30 VDC (90 mA)
	<b>Electrical Protection</b>	Over-voltage, reserve-voltage, output short-circuit protected
	<b>LED Indicators</b>	Power, J1939 communication status, level status and X/Y level condition
	<b>Connections</b>	M12, M12 Pigtail, Flying Lead Cable, Shielded Flying Lead, or Deutsch - 4 or 6 pin
	<b>Resolution</b>	0.1°
	<b>Absolute Accuracy (at 25°C)</b>	± 0.3°
MECHANICAL	<b>Housing Style</b>	Rectangular tabbed
	<b>Housing Material</b>	Plastic or Anodized Aluminum ( <i>high temperature applications</i> )
	<b>Housing Height</b>	Plastic - 1.0"; Aluminum - <i>Contact Joral</i>
	<b>Housing Width</b>	Plastic - 1.5"; Aluminum - <i>Contact Joral</i>
	<b>Housing Length w/ Tabs</b>	Plastic - 3.0"; Aluminum - <i>Contact Joral</i>
	<b>Mounting</b>	Tabs (0.187 diameter holes)
	<b>Weight</b>	Master - 3.0 oz; Slave - 2.0 oz
ENVIRONMENTAL	<b>Operating Temperature</b>	-40° to +80° C
	<b>Temperature Drift</b>	± 0.3 degrees across specified operating temperature limits
	<b>Storage Temperature</b>	-40° to +90° C
	<b>Humidity</b>	100%
	<b>Shock</b>	400g/6ms ( <i>MIL STD 202</i> )
	<b>Vibration</b>	5 to 3000 Hz, 20g ( <i>MIL STD 202</i> )
	<b>Protection Class</b>	IP69K ( <i>connection dependent</i> )

**DINC GENERAL ORDERING GUIDE**

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

General dimensions found on next page (S4; I3/2)  
J1939 setting/status message found on pages three and four (S4; I3/3-5)

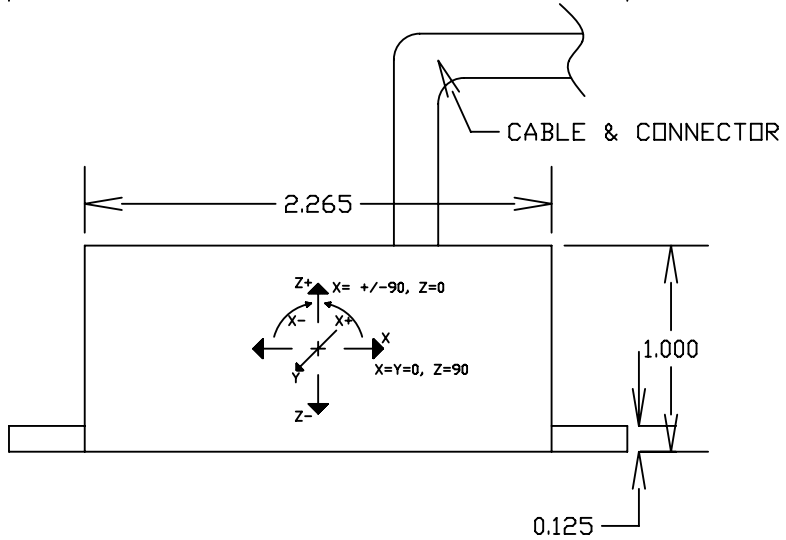
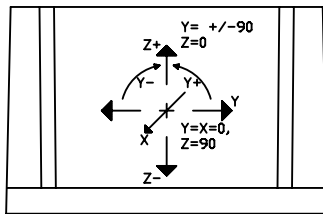
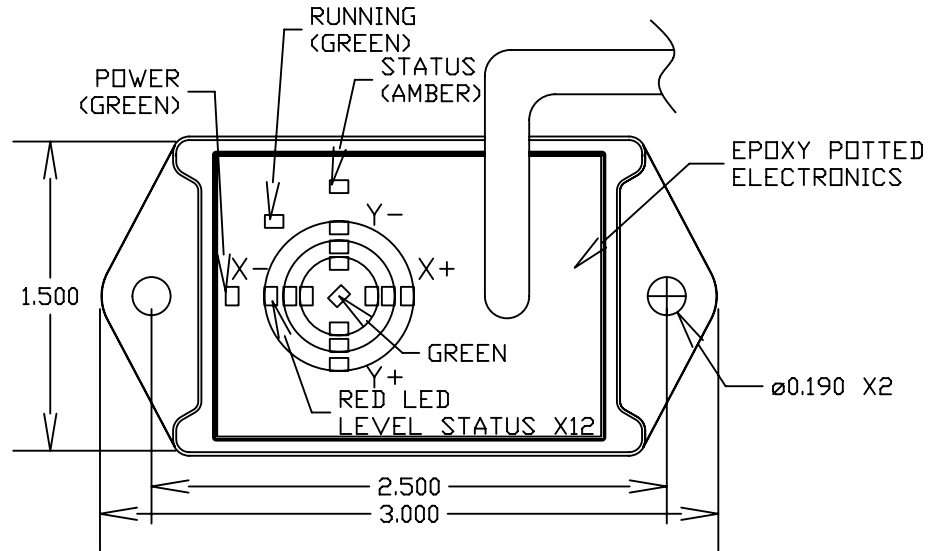


**DINC DIMENSIONS & GENERAL PIN OUTS**

**BOOM ANGLE NOTE:**

DINC inclinometer master/  
slave module use the  
same housing and share  
dimensions

DINC slave can be provided  
without LED indicators

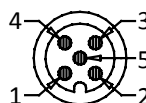


**DT04-4P MALE  
FACE VIEW**



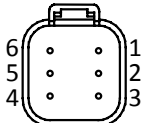
- DT04-4P J1939 OUTPUT**  
1 = YEL = CAN HIGH  
2 = GRN = CAN LOW  
3 = RED = +VDC (VIN)  
4 = BLK = COMMON/GROUND

**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

**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

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



**J1939 Dual 3 Axis Incline Sensor - Master STATUS Message 65467 (DINC)**

**MESSAGE PARAMETERS**

This message is transmitted by sensor at REP Rate

<b>PGN: 65467 (FFBB hex)</b>	
Transmission Repetition Rate	50ms
Data Length	8 bytes
Data Page	0
PDU Format	255 (FF hex)
PDU Specific	187 (BB hex)
Priority	4
Source Address	219 (DB hex)
Communication Bit Rate	250 K bits/sec

**PART NUMBERS**

5 pin M12	DINC-B-1939-M12
4 pin DT04	DINC-B-1939-DE4
6 pin DT04	DINC-B-1939-DE6
Flying Lead	DINC-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	219	65467
590 (id-tag 1)	220	65467
976 (id-tag 2)	221	65467
1500 (id-tag 3)	222	65467
2260 (id-tag 4)	223	65467
3400 (id-tag 5)	224	65467
5360 (id-tag 6)	225	65467
9530 (id-tag 7)	226	65467

**8 BYTE / 64 BIT DATA FIELD BIT POSITIONS**

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





**J1939 Dual 3 Axis Incline Sensor - Slave STATUS Message 65466 (DINC)**

**MESSAGE PARAMETERS**

This message is transmitted by sensor at REP Rate	
<b>PGN: 65466 (FFBA hex)</b>	
Transmission Repetition Rate	50ms
Data Length	8 bytes
Data Page	0
PDU Format	255 (FF hex)
PDU Specific	186 (BA hex)
Priority	4
Source Address	219 (DB hex)
Communication Bit Rate	250 K bits/sec

**SOURCE ADDRESS SELECTION**

Value (ohms)	Address	PGN
No Resistor	219	65466
590 ( <i>id-tag 1</i> )	220	65466
976 ( <i>id-tag 2</i> )	221	65466
1500 ( <i>id-tag 3</i> )	222	65466
2260 ( <i>id-tag 4</i> )	223	65466
3400 ( <i>id-tag 5</i> )	224	65466
5360 ( <i>id-tag 6</i> )	225	65466
9530 ( <i>id-tag 7</i> )	226	65466

**8 BYTE / 64 BIT DATA FIELD BIT POSITIONS**

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



**J1939 Dual 3 Axis Incline Sensor - SETTING Message 65290 (DINC)**

**MESSAGE PARAMETERS**

This message is transmitted by the controller

**PGN: 65290 (FF0A hex)**

Transmission Repetition Rate	n/a
Data Length	n/a
Data Page	0
PDU Format	255 (FF hex)
PDU Specific	10 (0A hex)
Priority	7
Source Address	249 (F9 hex)
Communication Bit Rate	250 K bits/sec

**SOURCE ADDRESS SELECTION**

Value (ohms)	Address	PGN
No Resistor	219	65290
590 (id-tag 1)	220	65291
976 (id-tag 2)	221	65292
1500 (id-tag 3)	222	65293
2260 (id-tag 4)	223	65294
3400 (id-tag 5)	224	65295
5360 (id-tag 6)	225	65296
9530 (id-tag 7)	226	65297

NOTE: SOURCE ADDRESS AND PRIORITY CHANGED 08 NOV 2011

**8 BYTE / 64 BIT DATA FIELD BIT POSITIONS**

BYTE	BIT	BIT FUNCTION	FIELD DESCRIPTION	
BYTE 1	1	SENS Setting bit0 LSB	<b>SENSITIVITY SETTING (3 bits)</b> <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	<b>LED WEIGHT SETTING (3 bits)</b> <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 Master LSB		<b>CALIBRATE/HOME MASTER FLAG (2 bits)</b> 01 = Calibrate/Home the Master sensor
	10	CAL Master MSB		
	11	CAL Slave LSB		<b>CALIBRATE/HOME SLAVE FLAG (2 bits)</b> 01 = Calibrate/Home the Slave sensor
	12	CAL Slave MSB		
	13	unused	<b>NOTE: Set reserved and unused bits to all 0's or all 1's</b>	
	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		

