

## ECV eCompass Series

***Jewell ECV eCompass represents the state of the art in magnetic compassing that delivers high accuracy for its small size, low-cost and low power***

The ECV eCompass Series provides stable azimuth, pitch, and roll measurements in dynamic conditions. The ECV's sensor suite consists of the following:

- 3-axis angular rate gyros
- 3-axis accelerometer
- 3-axis magnetometer
- 2-axis electrolytic tilt sensor

The advanced capabilities of the ECV are supported by updated eCompass PC software that simplifies engineering verification and integration tasks. The software provides the following functionality:

- Monitor and change compass settings
- Perform magnetic calibration
- Capture selected measurement data
- Maintain communication and setting logs



### Advantages:

- ✓ Exceptional dynamic performance
- ✓ High accuracy
- ✓ Precise factory calibration
- ✓ Wide Operating range
- ✓ RS232 & RS485 output available
- ✓ Fast response
- ✓ Low power

### Applications:

- Unmanned vehicles
- Robotics
- Platform stabilization
- Excavation machinery
- And more

# ECV eCompass Series

## Features:

### Static Accuracy

- Azimuth within  $0.5^\circ$  typical ( $0.1^\circ$  resolution)
- Pitch and roll within  $0.2^\circ$

### Dynamic Performance

- Gyro gimbal equations performed in firmware
- Azimuth within  $3^\circ$  typical for rates  $< 150^\circ/\text{sec}$
- Pitch and roll within  $1^\circ$  typical for rates  $< 150^\circ/\text{sec}$

### Wide Operating Range

- Ambient temperature  $-40^\circ$  to  $105^\circ\text{C}$  ( $-40^\circ$  to  $220^\circ\text{F}$ )
- $\pm 300^\circ/\text{sec}$  angular rate
- Total magnetic field (earth + hard-iron) to  $\pm 1.5$  Gauss
- $\pm 80^\circ$  dip angle range
- Total acceleration field to 1.5g (gravity = 1g)
- $\pm 90^\circ$  electrolytic tilt sensor pitch & roll range ( $\pm 180^\circ$  optional)

### Fast Response

- Up to 27.5 calibrated measurements per second
- Wake from standby in 50 msec

### Single Supply Operation

- 7 to 45V unregulated DC
- Thermal overload and reverse polarity protection

### Low Power

- 40 mA operating
- 10 mA idle
- 5 mA standby

### Wide Selection of ASCII or Binary Output data

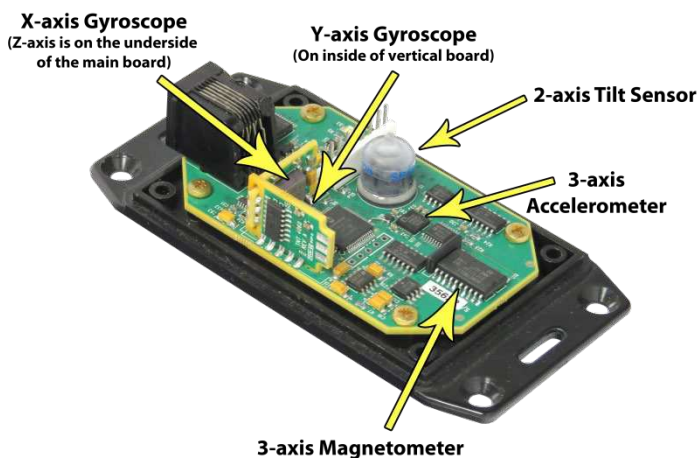
- Heading, pitch, and roll
- Temperature, input voltage, and dip angle
- Magnetometer X, Y, and Z
- Total, horizontal, and vertical magnetic field strength
- Raw and conditioned gyro data

### Two independent serial channels

- Full-duplex RS-232 for the external RJ12
- Either RS-232 or full-duplex RS-485 for the internal connector

### In-System Configuration and Test

- Laptop can be connected while unit operates in situ
- Perform hard and soft iron calibration
- Monitor outputs and change user-definable settings





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## Specifications\*:

### Heading Performance

Parameter	Value	Conditions
Accuracy <sup>1</sup>	$\pm 0.5^\circ$ rms	Static, Tilt < 35° Dip < 60°
	$\pm 3.0^\circ$ rms	Dynamic, rate < 150°/sec
Repeatability	$\pm 0.3^\circ$	Static, no filter
Response time	36 msec	Minimum, no filter
Dip Angle Range	$\pm 80^\circ$	
Tilt Range	$\pm 90^\circ$ Pitch/ $\pm 180^\circ$ Roll	
Update rate	27.5 measurements per second	

<sup>1</sup> May require calibration after installation to eliminate effect of local magnetic field

### Pitch and Roll Performance

Parameter	Value	Conditions
Accuracy	$\pm 0.3^\circ$	Factory calibrated
Repeatability	$\pm 0.2^\circ$	No filter
Range	$\pm 90^\circ$ Pitch/ $\pm 180^\circ$ Roll	( $\pm 42^\circ$ ) electrolytic tilt only
Settling time	50 msec	Gyro enabled

### Electrical

Parameter	Value	Conditions
Supply Voltage (V <sub>DD</sub> )	7 - 45Vdc unregulated	
Supply Current	40 mA operating	typical
	10 mA idle	
	05 mA standby	

### Environmental

Parameter	Value	Conditions
Operating Temp	-40° to 105°C	-20°C with electrolytic tilt
Storage Temperature	-50° to 150°C	
Humidity	0 to 90%	Non-condensing
Shock	200g	Max horizontal (with electrolytic tilt)

\*Specifications subject to change without notice on account of continued product development



## ECV eCompass Series

### Specifications (cont'd) \*:

#### Mechanical

Parameter	Value
Enclosure material	Plastic Enclosure (P Option): (ABS) Flame Retardant UL94 VO
	Aluminum Enclosure (A Option): Diecast Aluminum Alloy (Type 360.1)
PCB Size	1.8"W x 3.0"L x 0.6"H
PCB Mounting	4 #4 screws, 1.4" x 2.6" spacing
Connectors	8 pin, single-row, 0.1" friction header
	6 pin RJ12 modular jack
Weight	Plastic Enclosure (P Option): 3.2 oz. (90.7 grams)
	Aluminum Enclosure (A Option): 7.2 oz. (204.1 grams)

#### Interface

Parameter	Value
Signal type	RS-232 and RS-485
Baud rate	2400, 4800, 9600, 19200, or 38400 bps
Character Format	8 data, no parity, 1 stop
Input Buffer Size	110 characters
Output Buffer Size	110 characters
Output Format	NMEA 0183 and binary
Output Data Rate	1 to 1650 sentences per minute
Operating Modes	Continuous or sample
Angle Units	Degrees, mills, radians, 16-bit integer

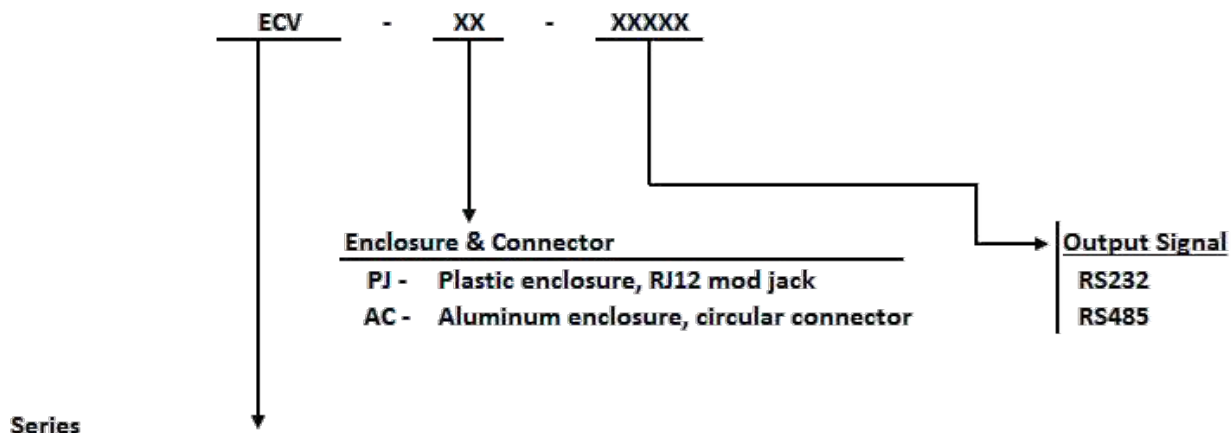
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## ECV eCompass Series

### How to Order:



#### Series

ECV - Electronic Compass with 3-axis magnetometer, 3-axis gyroscope, 2-axis tilt sensor & 3-axis accelerometer

#### Example:

ECV-PJ-RS232

ECV Electronic Compass with 3-axis magnetometer, 3-axis gyroscope, 2-axis tilt sensor & 3-axis accelerometer  
plastic enclosure, RJ12 mod jack & RS232 output signal

### Model & Part numbers:

Model Number	Part Number
ECV-P/J-RS232	02550403-ECV-001
ECV-P/J-RS485	02550403-ECV-004
ECV-A/C-RS232	02550403-ECV-002
ECV-A/C-RS485	02550403-ECV-003



## ECV eCompass Series

### Cable options:

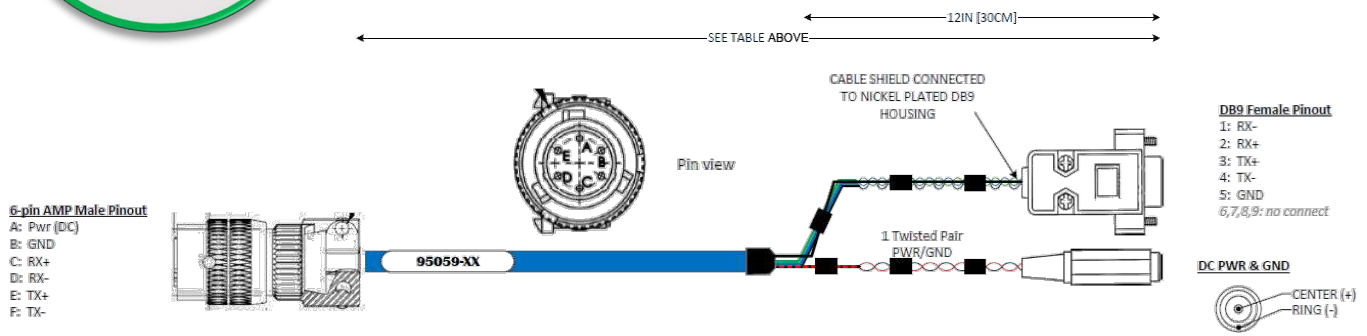
#### Option 1: RS485 to DB9 & Power Cable



How to order:

PART NUMBER	CABLE LENGTH
95059-01	78.5 IN (~2m)

Note: Longer cable length available upon request



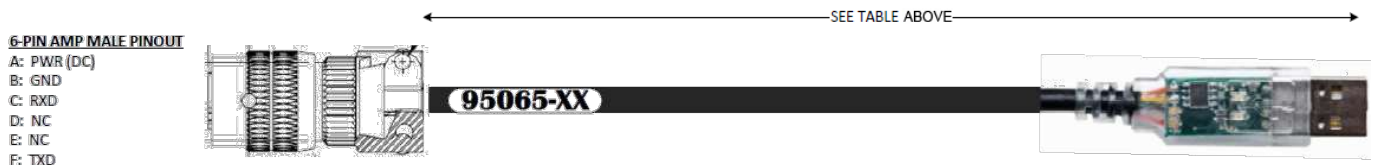
#### Option 2: RS232 to USB Cable



How to order:

PART NUMBER	CABLE LENGTH
95065-01	1.8m
95065-05	5m

Note: 5m is the max cable length for this option

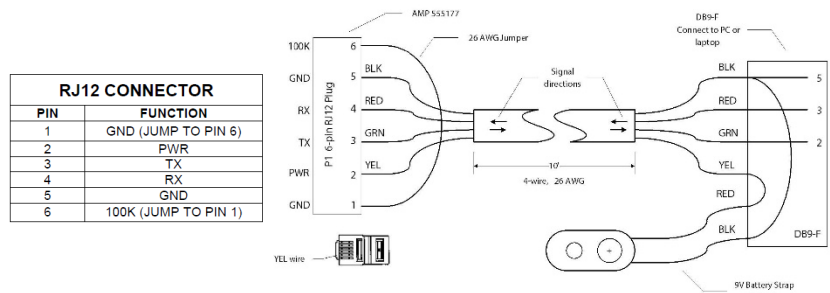


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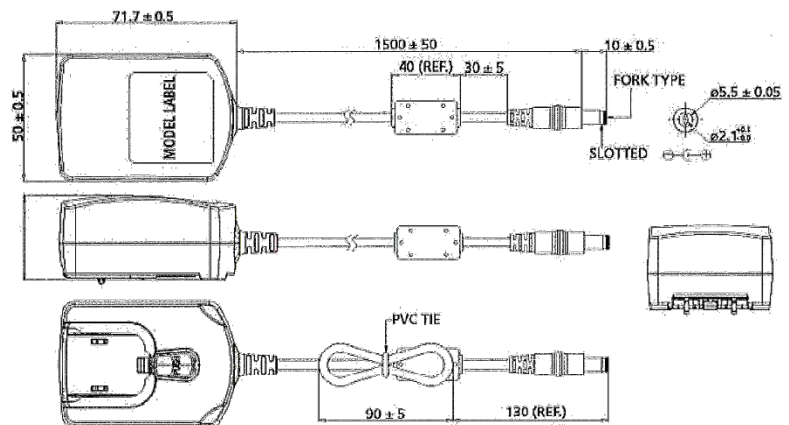
### Other accessories:



**RJ12 DB9 Cable**  
Part Number 879924



**110-240Vac to 12Vdc Transformer**  
Part Number 00254-02



**USB to RS232/RS485 Converter**  
Part Number F849284

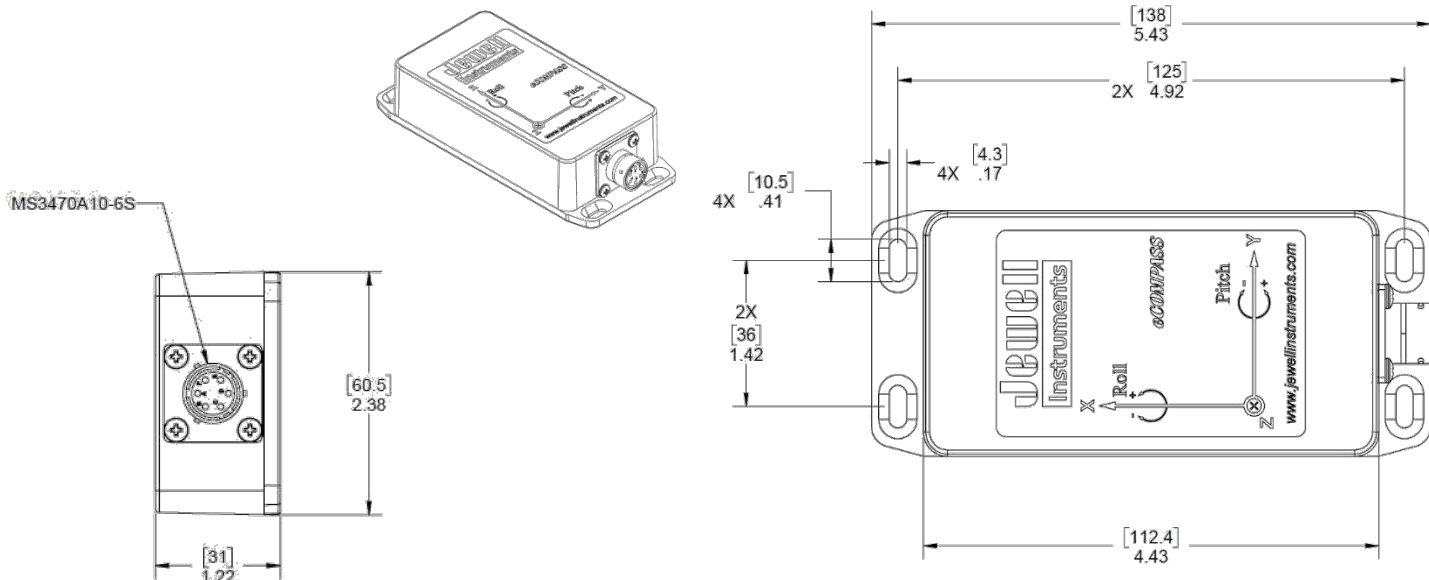


Dimensions: 5 x 4 x 2.5 in

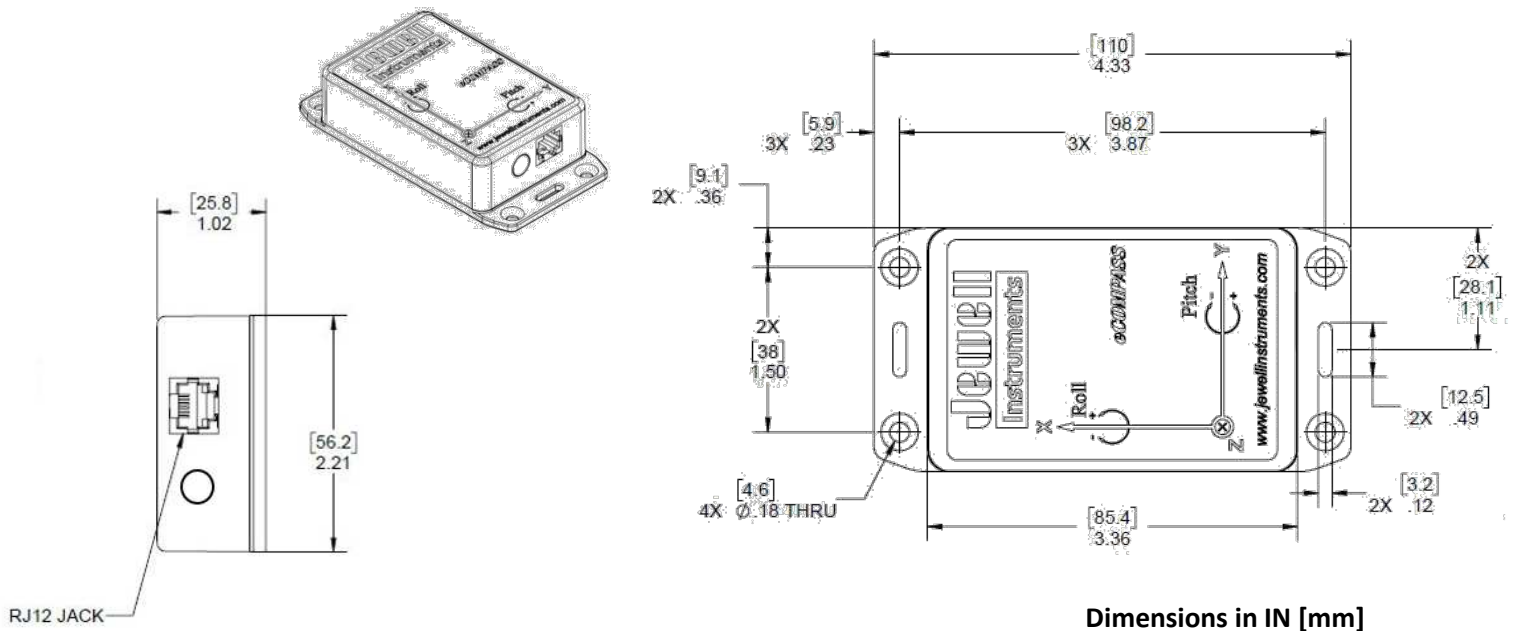


## ECV eCompass Series

### Outline Drawings (Aluminum enclosure):



### Outline Drawings (Plastic enclosure):

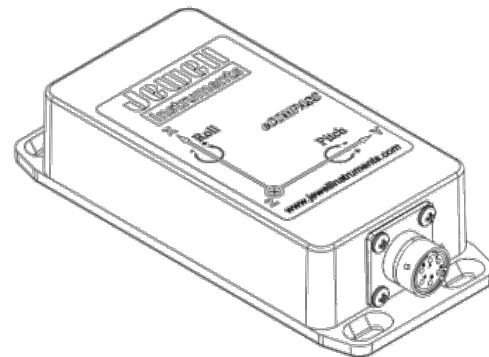




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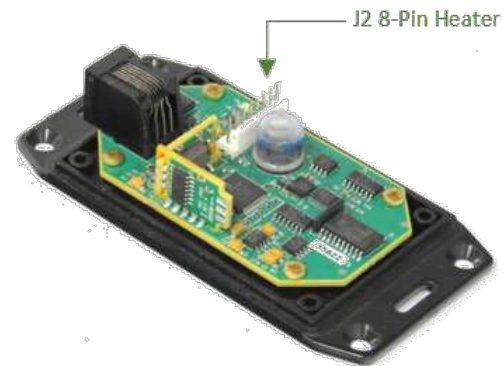
### Pin Out (Aluminum enclosure):

Circular Connector	RS232	RS485
Pin A	Power (7-45 Vdc)	
Pin B	Ground	
Pin C	RX	RX+
Pin D	-	RX-
Pin E	-	TX+
Pin F	TX	TX-

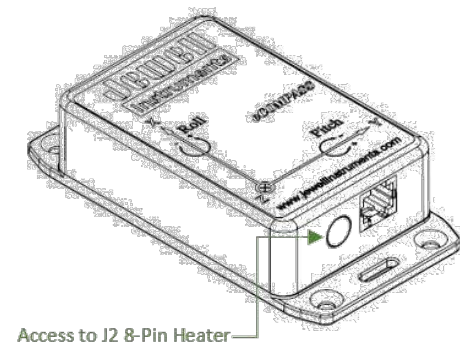


### Pin Out (Plastic enclosure):

RJ12 Mod Jack	Function
Pin 1	GND (Jump to Pin 6)
Pin 2	Power
Pin 3	TX
Pin 4	RX
Pin 5	GND
Pin 6	100K (Jump to Pin 1)



J2 8-PIN Header (RS485)		Wire
Pin 1	Power	Red
Pin 2	RS232 TX Out	Violet
Pin 3	RS232 RX In	Brown
Pin 4	RS485 RX+	Blue
Pin 5	RS485 RX-	Yellow
Pin 6	Ground	Black
Pin 7	RS485 TX+	Orange
Pin 8	RS485 TX-	Green



## ECV eCompass Series

### Other Resources:

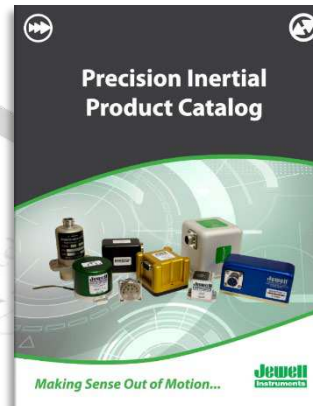
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#### ECV Tech Manual



Contact Jewell to obtain a copy of this manual

#### Inertial Catalog



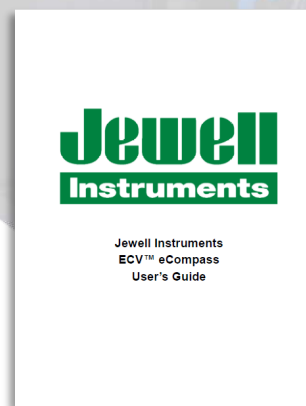
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#### Selector guide



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#### ECV User Manual



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