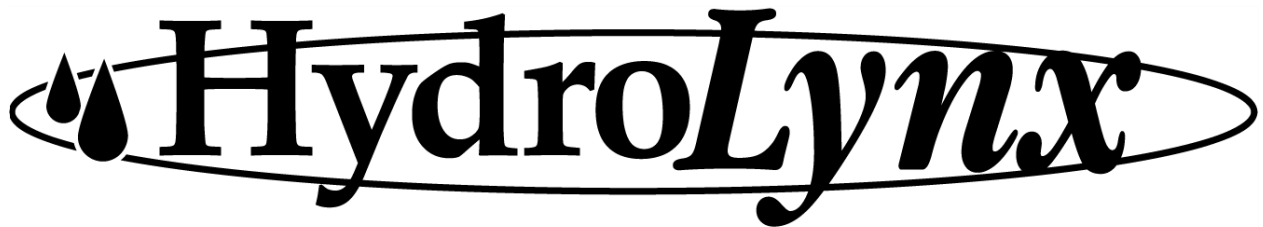


HydroLynx Systems, Inc.

Model 5096QI
Quadrature Interface

Instruction Manual



Document No: A102754
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Receiving and Unpacking

Carefully unpack all components and compare to the packing list. Notify HydroLynx Systems immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. If the equipment was shipped via Parcel Post or UPS, contact HydroLynx Systems for instructions.

Returns

If equipment is to be returned to the factory for any reason, call HydroLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage during the return shipment. Call HydroLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available, take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with packaging. Please write the RA# on the outside of the box.

Warranty

HydroLynx Systems warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. HydroLynx Systems' obligations under this warranty are limited to, at HydroLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall HydroLynx Systems' liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by HydroLynx Systems, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

Address

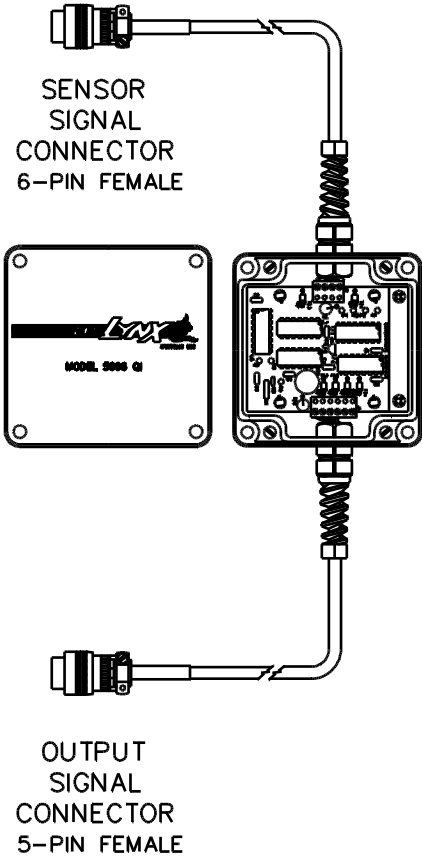
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TABLE OF CONTENTS

SECTION NO.	PAGE NO.
Equipment Configuration and Parts Identification	4
1.0 INTRODUCTION	5
1.1 General Description	5
1.2 Equipment Included	5
1.3 Specifications	5
2.0 INSTALLATION	5
2.1 Mounting	5
2.2 Cable	5
2.3 Connectors	6
3.0 THEORY OF OPERATION	6
3.1 Quadrature Encoding	6
3.2 Sampling/Decoding	6
3.3 PCB Connections	6
4.0 MAINTENANCE, TESTING, AND TROUBLESHOOTING	6
4.1 Maintenance	6
4.2 Testing	7
4.3 Down/Up	7
4.4 Troubleshooting	7
5.0 DRAWINGS	8

Equipment Configuration and Parts Identification



1.0 INTRODUCTION

1.1 General Description

The Model 5096QI Quadrature Interface translates quadrature encoder outputs into the standard 5096 Data Transmitter DIGITAL port input: form "C" increments and Down/Up status lines.

1.2 Equipment Included

- 1> 5096QI PCB
- 2> NEMA Enclosure
- 3> Sensor Signal Cable
- 4> Output Signal Cable

1.3 Specifications

Power:	5 Vdc @ $\leq 300 \mu\text{A}$ (current is typical and encoder dependent)
Input:	Quadrature 2-bit code
Output:	Form "C" increments, Down/Up status lines
Sensor cable:	5-cond 24 AWG shielded, with 6-pin MS female connector
Signal cable:	5-cond 24 AWG shielded, with 5-pin rotated MS female connector
Enclosure:	NEMA-4X
Size:	3.23" x 3.15" x 2.17" (82mm x 80mm x 55 mm)
Weight:	1½ lbs

2.0 INSTALLATION

The 5096QI is designed for easy installation at the stilling well, gauge house, or wherever the water level encoder is housed.

2.1 Mounting

Refer to drawing AC104994 for the enclosure mounting hole pattern. The small size of the 5096QI allows for many mounting options, including just placing the enclosure on the instrument shelf close to the encoder.

2.2 Cable

The sensor cable provided is 5 feet and the signal cable is 25 feet. At sites where the distance from the encoder to the 5096 Data Transmitter is more than 25 feet, additional signal cable may be added up to 1000 feet. (Consult factory for longer distances.) HydroLynx does not recommend adding cable to the sensor cable. (Consult factory if this is a requirement.)

2.3 Connectors

The 5096QI standard package configuration is pin-compatible with the HydroLynx Model 5096 Data Transmitter DIGITAL port and the Handar Model 436A Shaft Encoder. Refer to schematic drawings AC104980 and AC104981.

3.0 THEORY OF OPERATION

Designed to operate at very low current, the 5096QI draws less than 300 micro-Amps (typical) whenever it is used with the Handar 436A Encoder. The 5096QI is compatible with other industrial encoders and instruments. These encoders, such as the Paroscientific Model PS2 and the Design Analysis Associates Model H-350 series, must provide a quadrature output.

3.1 Quadrature Encoding

Quadrature encoding involves pulsing two digital signal lines 90 degrees out-of-phase with each other. Quadrature encoding is well suited to rotational measurements, as the direction of rotation determines which signal line leads the other while the number of pulses give the magnitude of change.

3.2 Sampling/Decoding

The 5096QI is a state machine that samples the quadrature signal lines and then decides, based upon the present and the previous samples, whether or not to change its output signal lines. The sampling feature allows the 5096QI to operate the encoder at very low current.

3.3 PCB Connections

Refer to drawings AC107980 and AC104981. The wiring connections to the PCB are made through slip-on terminal blocks that allow for positive cable connection. The pin configuration and wire colors of the output block remain standard with other HydroLynx digital liquid level sensors (5050EL and 5096EL).

4.0 MAINTENANCE, TESTING, AND TROUBLESHOOTING

Any visit to the site should include a visual inspection of all exposed hardware and cables to locate damage or wear.

4.1 Maintenance

The 5096QI does not require any periodic maintenance beyond a visual inspection.

4.2 Testing

- Connect 5096QI to 5096 DIGITAL input and the quadrature sensor output.
- Read-EV 1 for *initial count*.
- Slowly rotate sensor one complete revolution (UP).
- Read-EV 1 for *test count*.
- Limit: $test\ count = initial\ count + count\ (100)\ per\ revolution \pm 1\ count$.
- Slowly rotate sensor one complete revolution (DOWN).
- Read-EV 1 for *test count*.
- Limit: $test\ count = initial\ count \pm 1\ count$.
- Oscillate rotation 0.1 revolution (UP/DOWN) four times and return to initial position.
- Read-EV 1 for *test count*.
- Limit: $test\ count = initial\ count \pm 1\ count$.

4.3 Down/Up

If direction of rotation does not equate properly to EV 1 incrementing or decrementing (sensor moves UP while EV 1 counts Down) the incorrect Down/Up status line is being used for this configuration. Refer to drawing AC104980 cable assembly wiring diagram. Connector J1 pins 2 and 5 are the Down/Up status lines. One of these two pins has a white wire attached to it. Move white wire to the other pin. Verify that the rotation and counting are now correct.

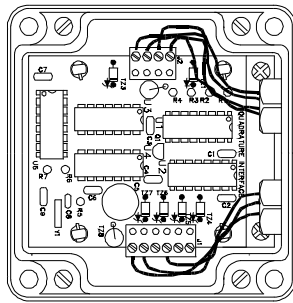
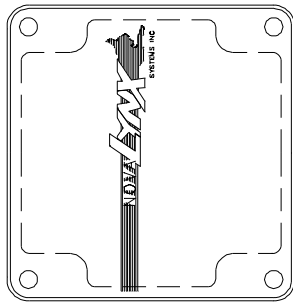
4.4 Troubleshooting

- Verify signal cables and connections.
- Check over-voltage protection.
- Disconnect signal cables.
- With an ohm-meter check for shorts between ground and all other lines.

5.0 DRAWINGS

The following list of drawings are provided with this manual for technical reference to assist in the installation, maintenance, and troubleshooting of the 5096QI.

- AC104993 Assembly - 5096QI Circuit board, Enclosure, Cables
- AC104980 Wiring Diagram - Signal Cable
- AC104981 Wiring Diagram - Sensor1 Cable



5096 QI
CIRCUIT BOARD
IN NEMA 4
ENCLOSURE
(COVER REMOVED)

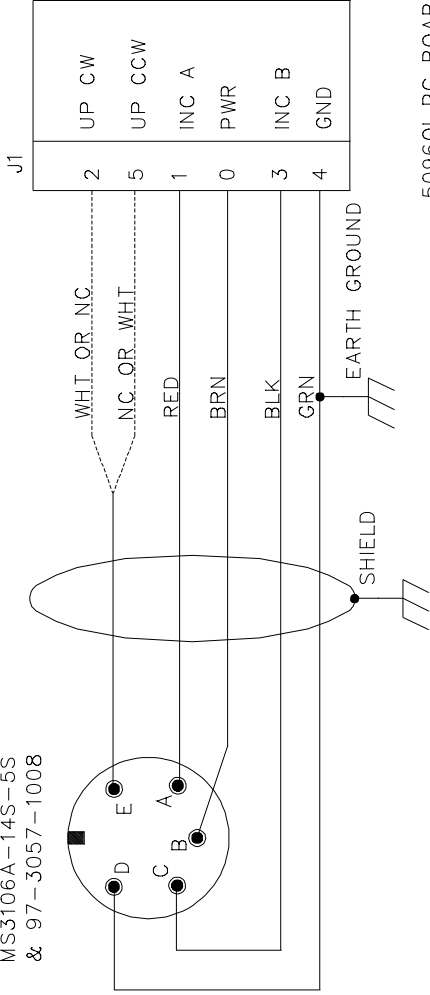
OUTPUT
CONNECTOR
5-PIN FEMALE
SIGNAL

SENSOR
SIGNAL
CONNECTOR
6-PIN FEMALE

MODEL 5096 QI
QUADRATURE INTERFACE CIRCUIT ASSEMBLY

980201	CHANGED POSITION OF HOLES	3/31/98
ECC#	DESCRIPTION	DATE
TITLE ASSEMBLY, 5096 QI		
CIRCUIT BOARD, ENCLOSURE, CABLES		
MODEL USAGE	6096	SHEET 1 OF 1
BY	RGN	SCALE ACAD DWG. NO.
DATE	10-8-95	1:1 AC104993B

5096QI OUTPUT SIGNAL CONNECTOR
 5-PIN FEMALE CONNECTOR
 CABLE END WITH CLAMP
 MS3106A-14S-5S
 & 97-3057-1008

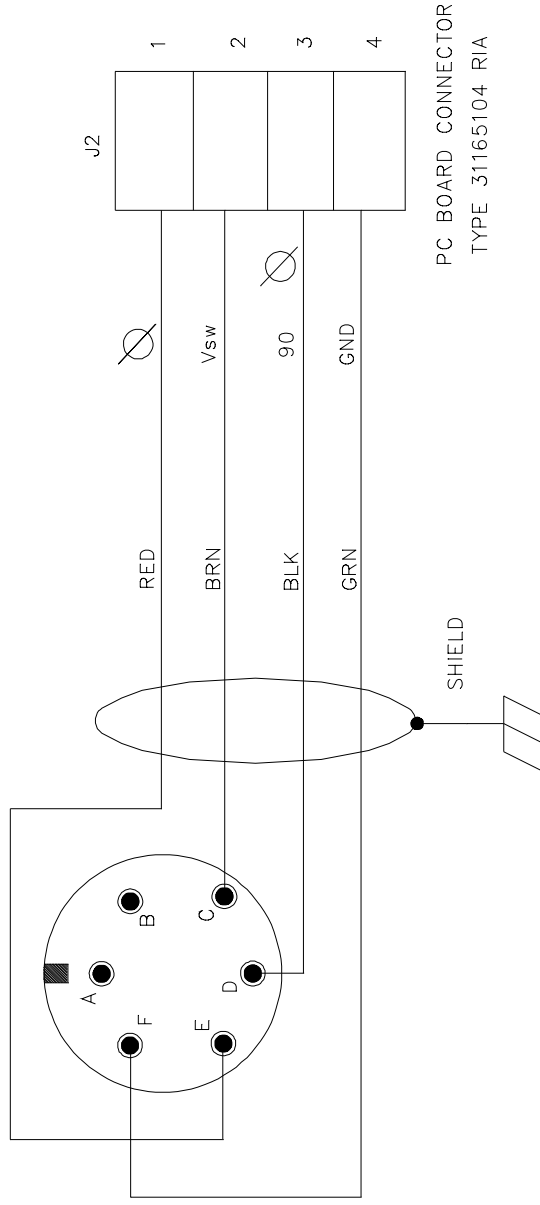


5096QI PC BOARD
 CONNECTOR IS TYPE 31165106 RIA


- NOTES: 1. CABLE IS BELDEN #9535, 5 COND., 24 AWG, SHIELDED.
 2. CABLE LENGTH IS 20 FT.
 3. SHIELD WIRE IS COVERED WITH CLEAR HEAT SHRINK TUBE.

980201	ADD EARTH GROUND	02/08/02
ECN #	DESCRIPTION	DATE
MODEL USAGE	HydroLynx	
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES		
FRACTIONS = €		
.XX = €		
.XXX = €		
MAT'L		
FINISH		
TREATMENT		
DRAWN BY M.PUFFER	DATE 02/08/02	DWG TYPE WIRING DIAGRAM
CHECKED BY	DATE	SIZE A
	DWG NO. AC104980	REV
	MODEL NO. 5096QI	
	TITLE CABLE, SIGNAL	

SENSOR SIGNAL CONNECTOR
 6-PIN FEMALE CONNECTOR
 CABLE END WITH CLAMP
 MS3106A-14S-6S
 & 97-3057-1008



- NOTES: 1. CABLE IS BELDEN #9535, 5 COND., 24 AWG, SHIELDED.
 2. CABLE LENGTH IS 5 FT.
 3. SHIELD WIRE IS COVERED WITH CLEAR HEAT SHRINK TUBE.

980201	CHANGE GROUND CONNECTION	02/08/02
ECN#	DESCRIPTION	DATE
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES	MODEL USAGE	
FRACTIONS = €		
.XX = €	MODEL NO.	509QI
.XXX = €	TITLE	CABLE, SENSOR
MAT'L	DWG TYPE	WIRING DIAGRAM
FINISH	DATE	02/08/02
TREATMENT	CHECKED BY	M.PUFFER
	DWG NO.	A
	SIZE	AC104981
	REV	

