Baseline Two-Wire Technology

Baseline's biCoders work with Baseline's biLine™ two-wire technology to create the only true bi-directional two-wire devices in the industry. Baseline's biCoders not only receive commands from the controller, they also send real-time information back to the controller. Plus, Baseline's biCoders have built-in diagnostic LED lights that tell you at a glance whether the device is working.

This smart technology also enables you to assign any biCoder to a zone or function from the controller after the biCoder has been installed in the field. With a multi-station biCoder, you can assign any station to any zone, in any order.

biLine Features

- The biLine II protocol for two-wire operates below 30 VAC RMS.

- True two-way communication that uses a 9-byte packet for commands and replies.

- Search for and identify all devices connected to the two-wire and list them in the controller.

- Address devices by serial number by assigning each zone address a device serial number.

- Re-address any device from the controller by re-assigning the devices serial number to a new zone address.

- Any station on a multi-station biCoder can be assigned from the controller to any zone address in any order.

- Detect and repair from the controller all address conflicts for devices that are connected to the two-wire.

- Automatically detects communication collision on the two-wire and resends any message experiencing an error.

- Search for and assign each decoder serial number to a zone address report whether or not a solenoid is present.

biCoder Specifications

- Baseline's biCoders are available in single, dual, and quad-station configurations. They are also available for flow and pause devices.

- All biCoders are fully sealed, submersion-proof, and approved for direct bury.

- Automatically shut down any attached solenoid(s) if communication is lost with the controller

- Shock resistant

- Freeze/heat resistant -4°F to 140°F (-20°C to 60°C)

- Manufactured with 24 inches of 16-gauge PVC jacketed solid core wire to connect to the two-wire and 24 inches of 18-gauge PVC jacketed stranded core wire to connect to the valve wire.

- Includes a built-in amperage meter that accurately measures and diagnoses valve solenoid electrical problems such as "no current," "station short," or "over current."

- Multi-station biCoders have color-coded wires for each station.

- All biCoders, except the BL-5303 external air temperature sensor, have built-in LEDs that blink during communications on the two-wire side and remain lit when power is supplied to the valve.

- Run up to two typical solenoids up to 150 feet away from valve decoder using standard 14-gauge irrigation wire per station wire (excluding BL- 5201, 1 valve direct burial biCoder).

- Built-in surge protection.

- All biCoders carry Baseline's standard warranty of 5 years from date of install.

- Pause biCoders are able to interface and read any normally closed switch pause device (including rain, wind, pressure, tank floats, and temperature).

Solenoid Requirements

Requires a typical solenoid with approximately 400 mA inrush current with approximately 200 mA holding current.

Two-Wire Irrigation Cable Specifications

Operating Voltage: 600 V RMS max

Temperature Rating: 140°F (60°C)

In addition, the two-wire must meet one criterion within each of the following categories:

Outer Jacket

High density polyethylene (HDPE) between 0.035" and 0.048" thick, conforming to ICEA S-61-402 and NEMA WC5

Conductors (two of the same gauge, conforming to ASTM B-33, B-3, or B-8)

- Bare copper
- Tin coated solid copper

Conductor Arrangement

- Conductors that are twisted
- Conductors that are laid in parallel

Conductor Insulation

- Low density, high molecular weight polyethylene (PE) with a thickness of 0.045"
- PVC conforming to UL-493 or UL-719 for thermoplastic-insulated style UF (Underground Feeder)

Conductor Color Coding

- Black & red (recommended)
- Black & white
- Blue & red

Examples of Approved Wire

- Coleman Cable #51452
- Paige P7072D, P7296D, P7350D, and P7354D
- Regency 14/2 and 12/2 Maxi Cable, Toro Decoder Cable, and Hunter Decoder Jacketed
- Service Wire DEC12/2BE and DEC14/2BE

Two-Wire Path Topology Specifications

- The two-wire path may be looped, spliced, or branched permitting extensions of the path in multiple directions.

- Make all splices in a valve box.

- The distance from the controller to the end of any one wire run must not exceed the maximum distance specified for the gauge of wire as described in the tables for Wire Run Lengths.

Two-Wire Run Lengths (in feet)

Straight Runs				
Wire Gauge	#18	#16	#14	#12
Wire Length	1,900	3,100	5,000	8,000

Looped Runs				
Wire Gauge	#18	#16	#14	#12
Wire Length	3,800	6,200	10,000	15,000

Total wire allowed for one controller is 16,000 ft on either 12 or 14 gauge.

Specifications are subject to change without notice.

Maximum Concurrent Zones

Two-Wire Length (ft) #14 Gauge					
	1,000	2,000	3,000	4,000	5,000
100	13	11	8	4	2
90	14	12	9	5	3
80	15	12	10	6	4
70	15	13	11	7	5
60	15	14	12	8	6
50	15	15	13	9	7
40	15	15	14	10	8
30	15	15	15	11	9
20	15	15	15	12	10
10	15	15	15	13	11

biCoder and Sensor Load Count (left axis)

Two-Wire Length (ft) #12 Gauge						
	1,000 – 3,000	4,000	5,000	6,000	7,000	8,000
100	15	14	13	8	6	4
90	15	15	14	9	7	5
80	15	15	15	10	8	6
70	15	15	15	11	9	7
60	15	15	15	12	10	8
50	15	15	15	13	11	9
40	15	15	15	14	12	10
30	15	15	15	15	13	11
20	15	15	15	15	14	12
10	15	15	15	15	15	13

biCoder and Sensor Load Count (left axis)

Maximum Wire Run Lengths for Devices

Two-Wire Device	Between	Maximum Wire Run (in feet)	Wire Type
Valve biCoder	biCoder and solenoid	150	14 gauge
Flow biCoder	biCoder and hydrometer	1000	Isolated 2-conductor shielded 20 AWG UL type PTLC or larger stranded copper wire rated to 221°F
Event biCoder	biCoder and pause device	250	14 gauge
Pump Relay biCoder	biCoder and the 24 VAC load	250	14 gauge

Wire Connection Specifications

- For all wire connections, use connectors that are 3M™ DBR/Y-6 or equivalent direct bury splice.

- Use connectors that effectively seal moisture out.

- Use twist connectors with a steel spring and flame-retardant insulator.

- Use a connector with an outer tube made of UV-resistant polypropylene.

- Use moisture-resistant grease inside the connector.

- Use a connector with a minimum voltage rating of 600 volts.

- Use a connector that can operate in temperatures ranging from -40°F to 221°F (-40°C to 105°C).

- Use a connector that can fit five 18-gauge, four 12-gauge, or three 10-gauge wires inside the connector.

- Make all connections per manufacturer's specifications.

- Verify that no loose, unshielded wiring can touch the soil, water, or another copper conductor causing a leakage of current to the ground or a short circuit across wires.

- Make all splices inside a valve box.

- Mount all connections vertically to eliminate standing water inside the DBR/Y-6 connector.

How to Specify

BL-5201	1 Valve direct burial biCoder
BL-5201DC	1 Valve direct burial biCoder for use with DC latching solenoids
BL-5202	2 Valve direct burial biCoder
BL-5202DC	2 Valve direct burial biCoder for use with DC latching solenoids
BL-5204	4 Valve direct burial biCoder
BL-5315B	15" Original biSensor Soil Moisture Sensor. Includes 50' of wire
BL-5311	3" Compact biSensor Soil Moisture Sensor. Includes 50' of wire
BL-5303	External air temperature sensor
BL-5308	Direct burial standard flow sensor/meter biCoder
BL-5309	Direct burial standard flow sensor/meter biCoder for use with low power flow meters such as Mag Meters
BL-5201MV	Direct burial master valve biCoder
BL-5201PR	Direct burial pump start/relay switching biCoder
BL-5401	Outside operation button in plastic wall mount enclosure "Coach's Button"
BL-5402	Direct burial event biCoder
BL-5406	Direct burial pressure biCoder
BL-5406-KIT	Direct burial pressure biCoder and a compatible pressure sensor
BL-LA01	Direct burial lightning arrestor

Specifications are subject to change without notice.