CHEYENNE GREEN INDUSTRY WORKSHOP 2019

DECODER SYSTEM TIPS & TROUBLESHOOTING

JAN. 25TH 2019

DECODER SYSTEM TIPS CLASS CURRICULUM

- COMPONENTS
- DESIGN TYPES
- DESIGN/INSTALLATION TIPS
- TROUBLESHOOTING TIPS

DECODER SYSTEM COMPONENTS

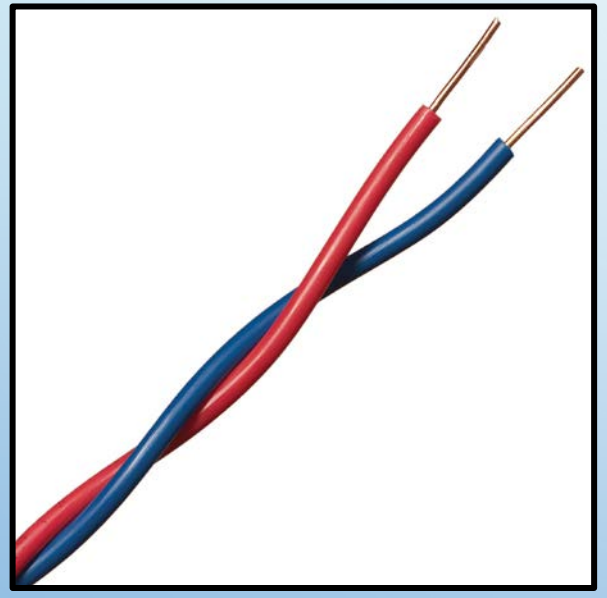
DECODER CONTROLLERS

WeatherTRAK

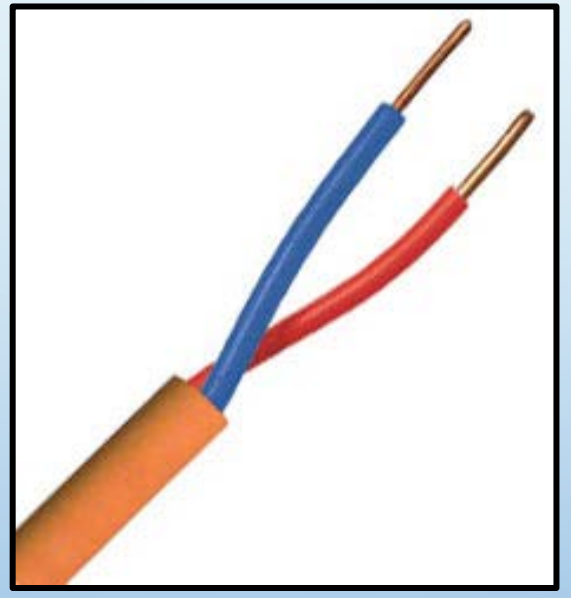
Hunter

RainBird

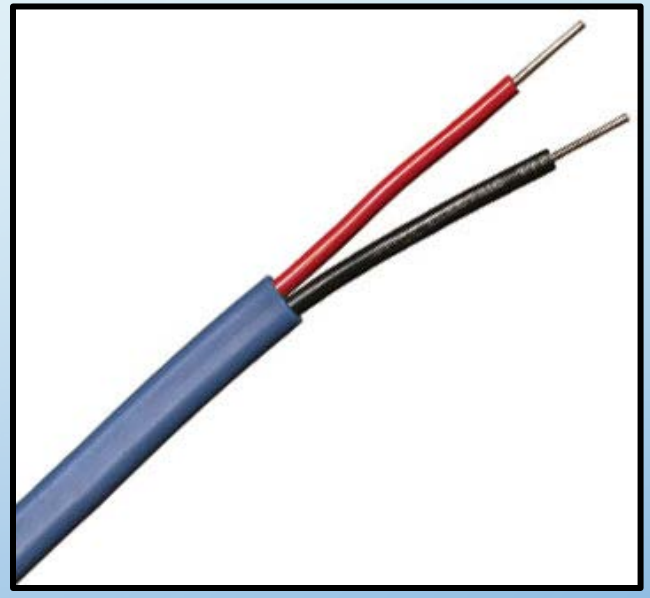
DECODER 2-WIRE



Twisted non-jacketed



Twisted jacketed



Parallel

DECODERS

WeatherTRAK

Hunter

RainBird

GROUNDING DEVICES

Grounding Rod Grounding Plate Grounding Enhancement Materials

2-WIRE CONNECTORS

DBO/B-6 **DBR/Y-6**

3M™ Direct Bury Splices

FUSED/ISOLATION DEVICES

270DCFD1L 270DCFDL 270DCFD3L

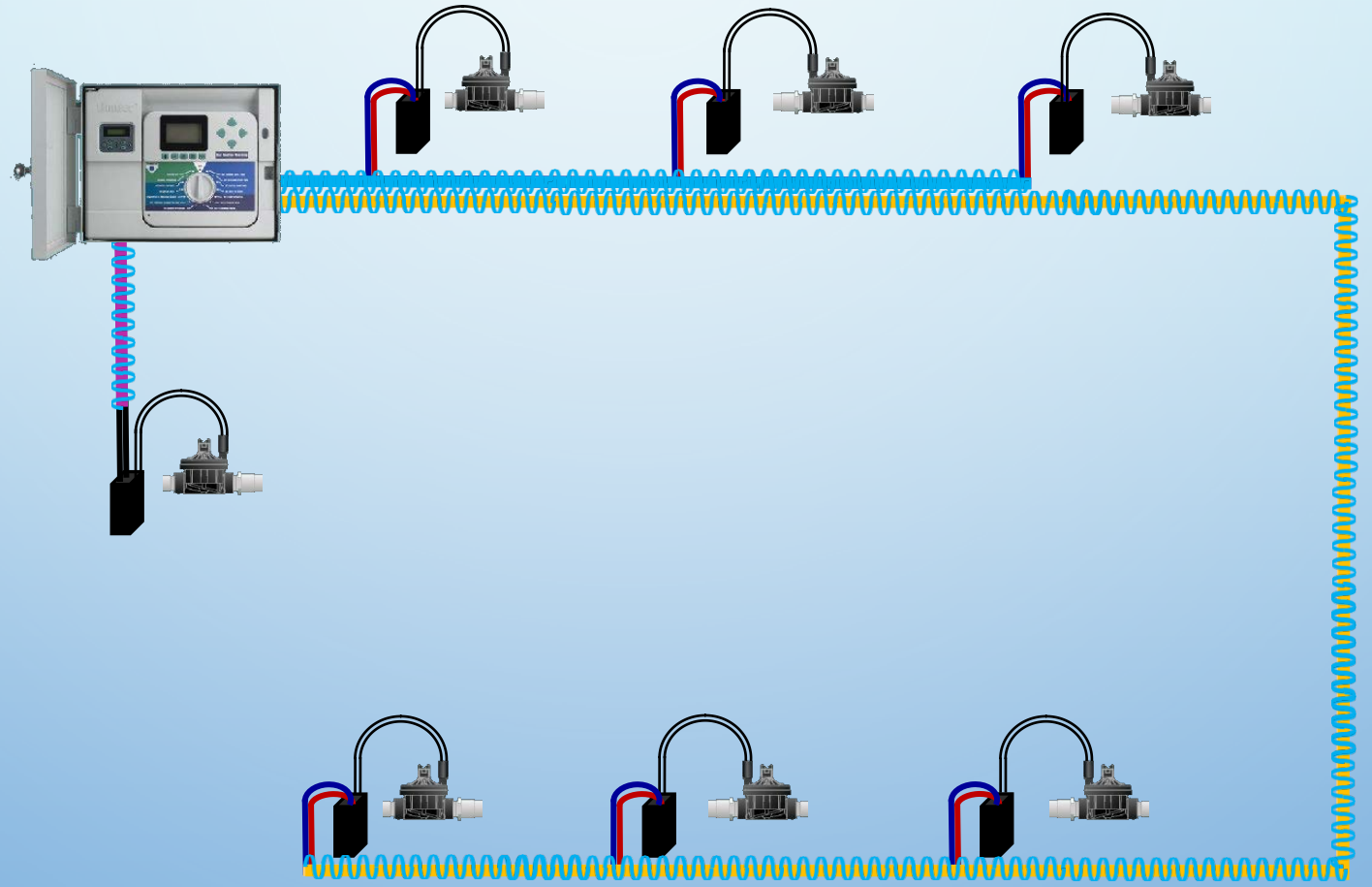
Paige Fuse Device (DCFD)™

2-WIRE PATH/DECODER TAGS

270WMT

Paige Wire Marking Tags

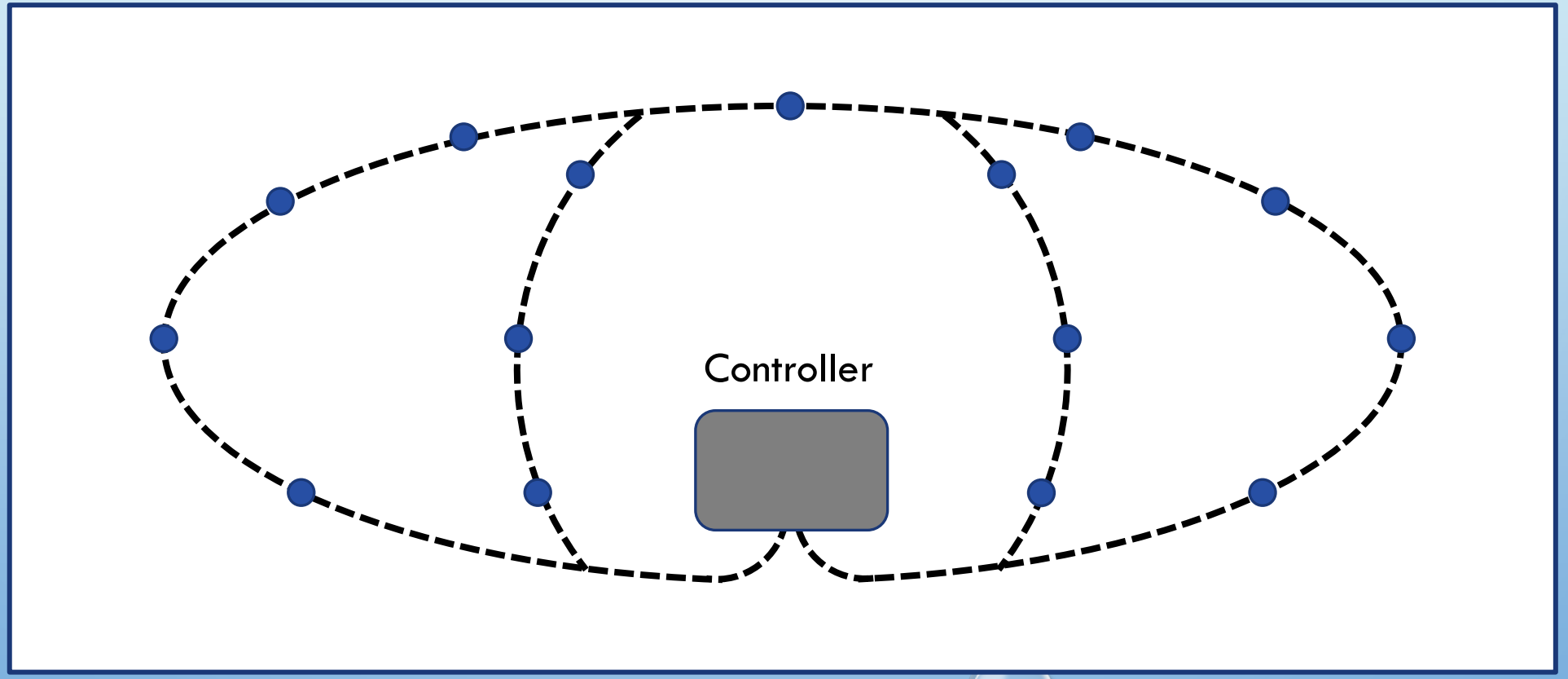
TYPICAL DECODER SYSTEM



DECODER SYSTEM DESIGN/INSTALLATION TYPES

LOOPED OR BRANCH

LOOPED TYPE 2-WIRE INSTALLATION



LOOPED 2-WIRE PATH

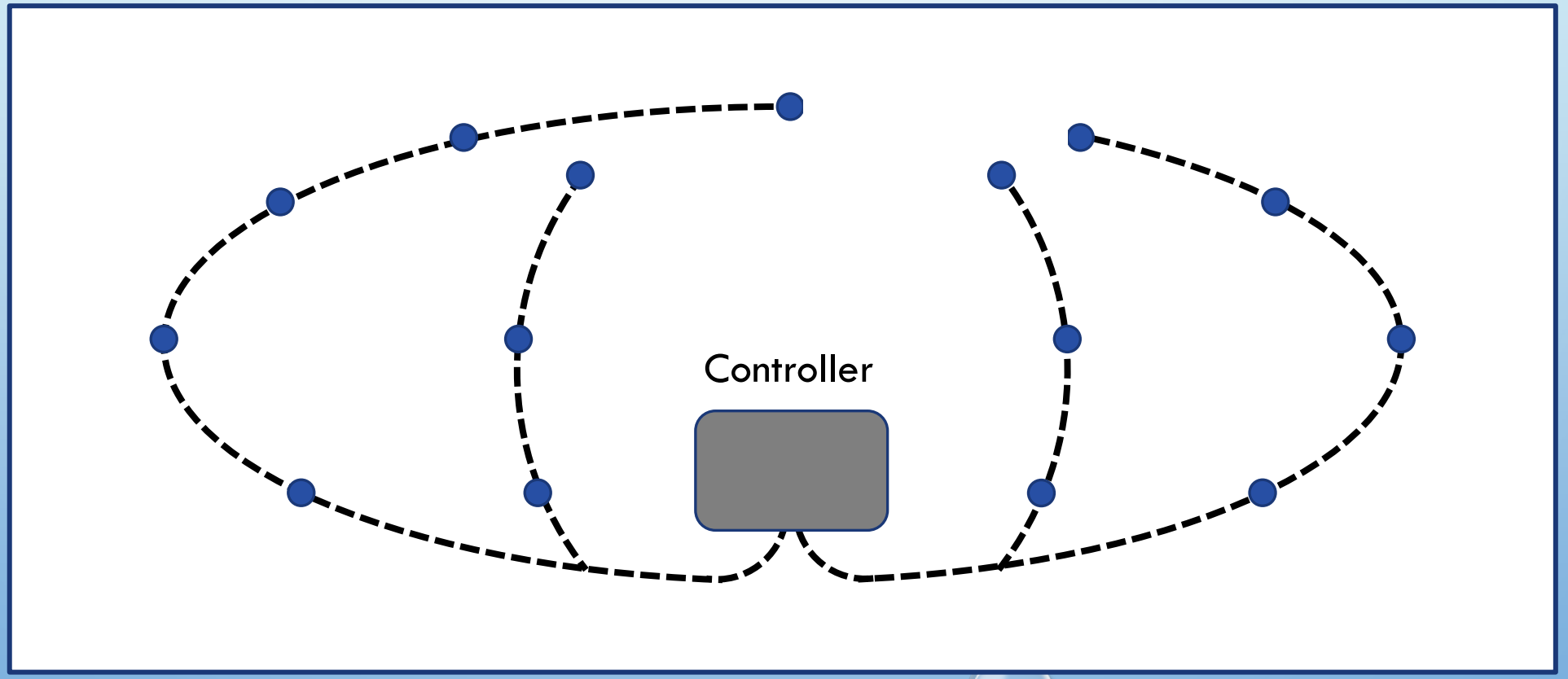
PROS

1. IF THE 2-WIRE PATH IS DAMAGED, THE SYSTEM STILL MIGHT WORK.
2. THE ELECTRICAL LOAD IS SPREAD OUT OVER THE 2-WIRE PATH.

CONS

1. YOU CAN HAVE A DAMAGED 2-WIRE PATH AND NOT KNOW ABOUT IT UNTIL A CATASTROPHIC FAILURE.
2. CAN BE TOUGH TO FIND THE DAMAGED AREA IN THE 2-WIRE PATH.
3. ONE SHORTED DECODER WILL BRING DOWN THE ENTIRE 2-WIRE PATH.

BRANCH TYPE 2-WIRE INSTALLATION



BRANCH 2-WIRE PATH

PROS

1. THE 2-WIRE PATH STOPS WORKING AT THE DAMAGED AREA.
2. EACH 2-WIRE PATH CAN BE A SEPARATE COLOR FOR EASY IDENTIFICATION IN THE FIELD.
3. A SHORTED DECODER CAN ONLY BRING DOWN ONE LEG OF THE 2-WIRE PATH.

CONS

1. THE 2-WIRE PATH STOPS WORKING AT THE DAMAGED AREA.
2. EACH 2-WIRE PATH BEARS THE LOAD OF THE ENTIRE LEG.

DBY/R-6 CONNECTOR PROCEDURE

Step 1

- Use a pocket knife or utility knife to radially score the outer jacket of the cable about 12” from the end.
  DO NOT CUT ALL THE WAY THROUGH THE OUTER JACKET OR INTO THE INSULATIONOF THE INNER

Step 2

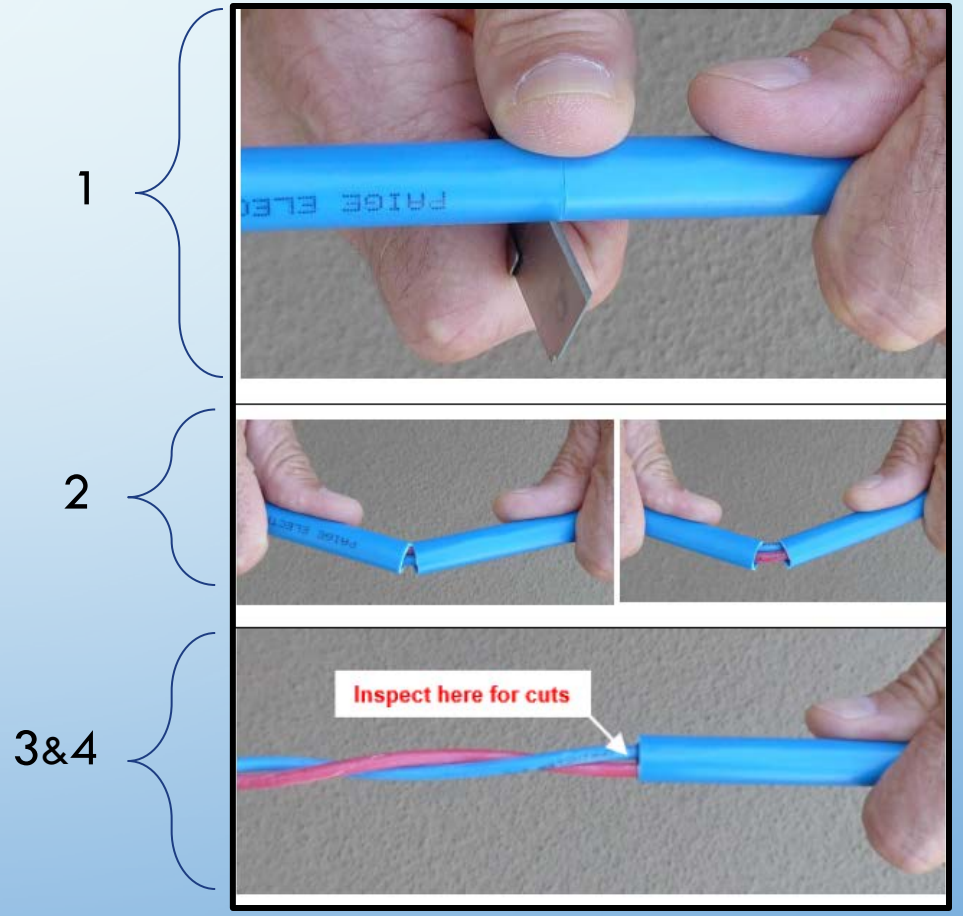
- Bend the jacket back and forth at the point where the jacket was scored with the knife and the jacket should snap.

Step 3

- Slide the 12” piece of the jacket off to expose the twisted pair of wires.

Step 4

- Inspect the inner conductors to ensure there are no nicks or cuts in the wires.
- If nicks are found cut the cable at the nick point and start over.



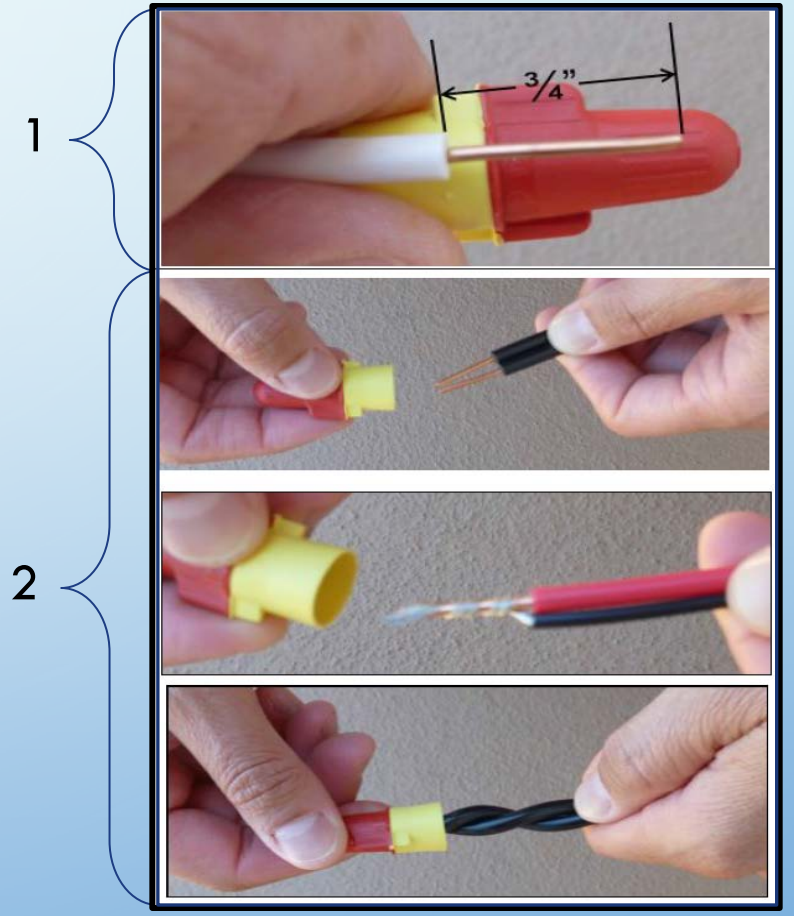
DBY/R-6 CONNECTOR PROCEDURE

Step 1

- Strip ¾” of insulation off solid wire
- For stranded wires, strip off 1¼” of insulation.
- Feel for the wire nut locking into place at the bottom of the tube.

Step 2

- For solid wire, pinch the tips of wires together and twist them.
- For solid and stranded wire combinations, twist the stranded wire onto the solid one.
- Trim the excess strands of the stranded wire to ¾”
- Twist on the wire nut clockwise until the insulation twists 1 or 2 turns.



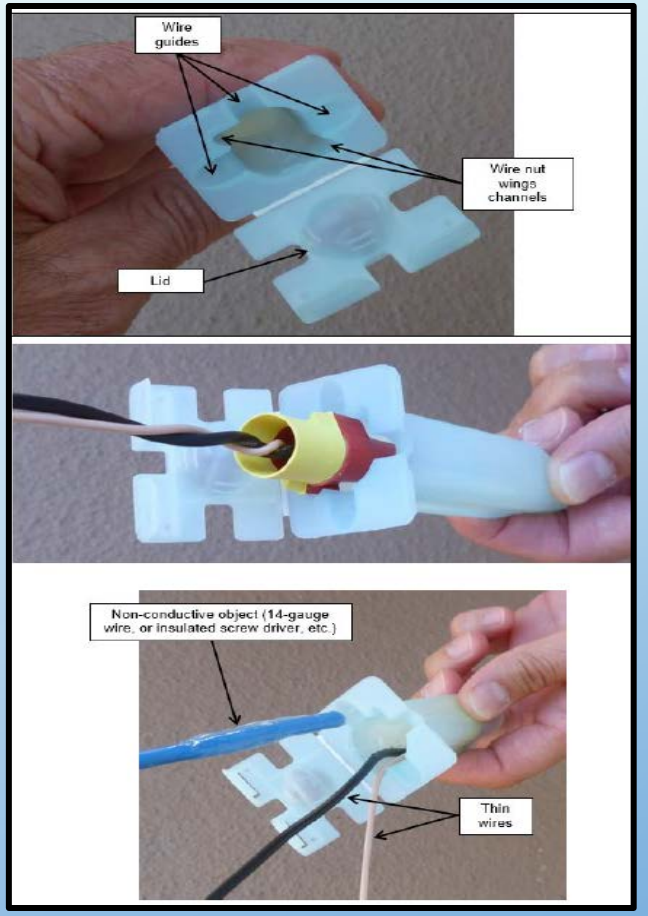
DBY/R-6 CONNECTOR PROCEDURE

<u>Step 3</u>

- Line-up the wings of the of the wire nut with the channels of the tube
- Slide the wires the wire nut into the tube until the bottom-out.
- Feel for the wire nut locking into place at the bottom of the tube.
- Pull and push in and out a few times to seal around the wires.

Note: If the wires being spliced are too thin, it can be difficult to push them (and the wire nut) into the grease-filled tube.

You may use a “thin non-conductive object” to push the wire nut (and wires) into the tube



DBY/R-6 CONNECTOR PROCEDURE

<u>Step 4</u>

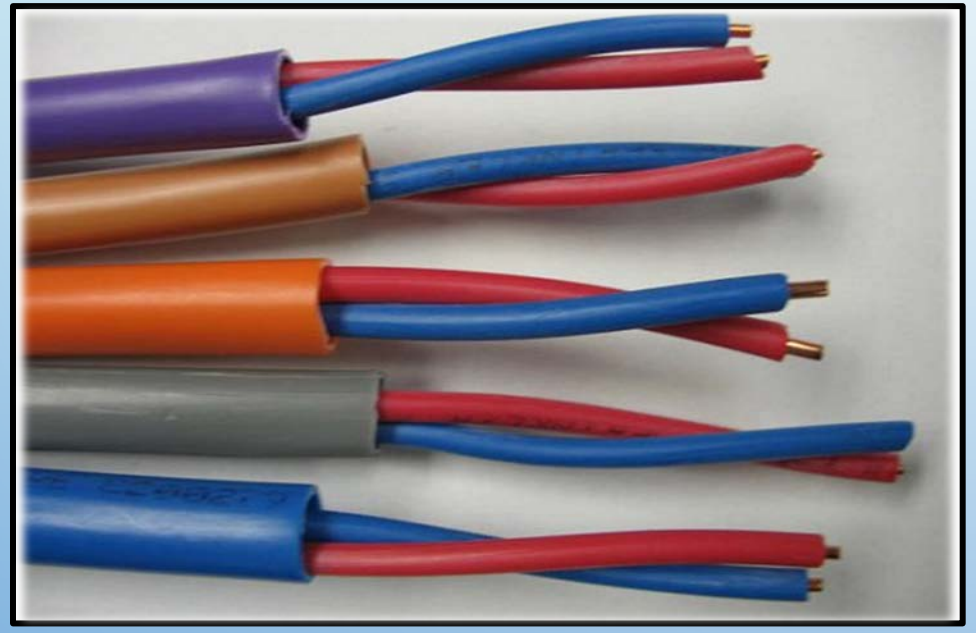
- Position the wires in one of the three wire guides and close the lid until it snaps shut.
- Turn the connector upside down.
- If the wires are skinny, it is better to put multiple wires into one wire guide so that the strain relief is maximized

Click Here to Watch How To Video

MISCELLANEOUS DESIGN/INSTALLATION TIPS

- Use the specific items the manufacturer has listed in their design guide.
- Labels on the jackets of the 2-wire paths at the controller.
- Label the valve box and/or the valve itself.
- Use conduit sleeves under hardscapes and roadways. (Rodents?)
- Use different colored jacketed 2-wire for the different legs of 2-wire.
- Test each grounding point with an Earth Resistance Tester. (>10 ohms)

WIRE MARKING/DESIGNATION TIPS



Jacket wire color

Paige #270WMT

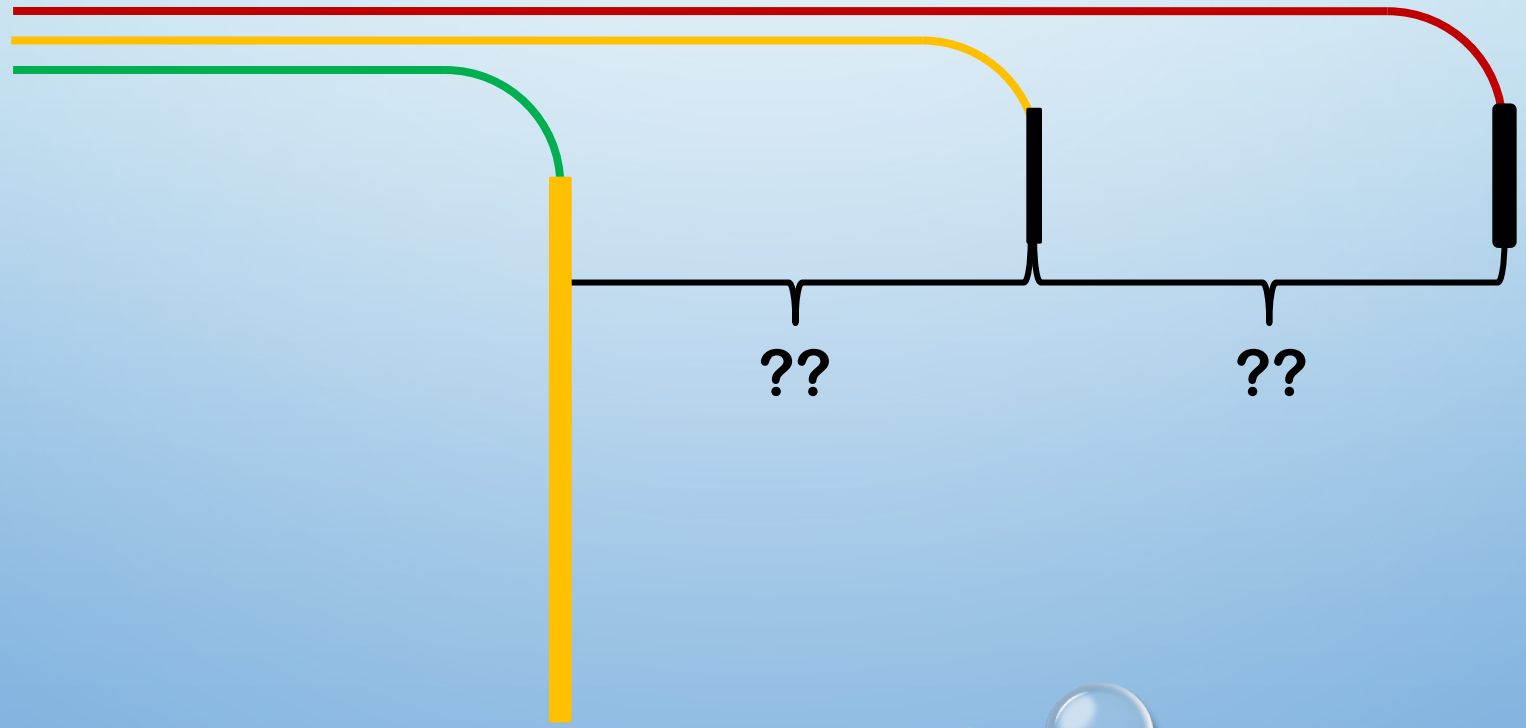
EARTH GROUND TESTING

Extech 382252
Earth Ground Resistance Tester

Measurement Specifications

Measurement	Range	Resolution	Accuracy
Earth Ground Resistance	20Ω	0.01Ω	± (2% reading + 10 digits)
	200Ω	0.1Ω	± (2% reading + 3 digits)
	2000Ω	1Ω	
Earth Voltage Frequency: 40 to 500Hz	0 to 200VAC	0.1V	± (3% reading +3digits)
Resistance	0 to 200kΩ	0.1kΩ	± (1% reading +2 digits)
	Overload Protection: 250 Vrms		
AC Voltage 40 Hz to 400Hz	0 to 750V	1V	± (1.2% reading +10 digits)
	Overload Protection: 750 Vrms, Input Impedance: 10MΩ		
DC Voltage	0 to 1000V	1V	± (0.8% reading +3 digits)
	Overload Protection: 1000 Vrms, Input Impedance: 10MΩ		

EARTH GROUND TESTING



DECODER SYSTEM TROUBLESHOOTING TOOLS

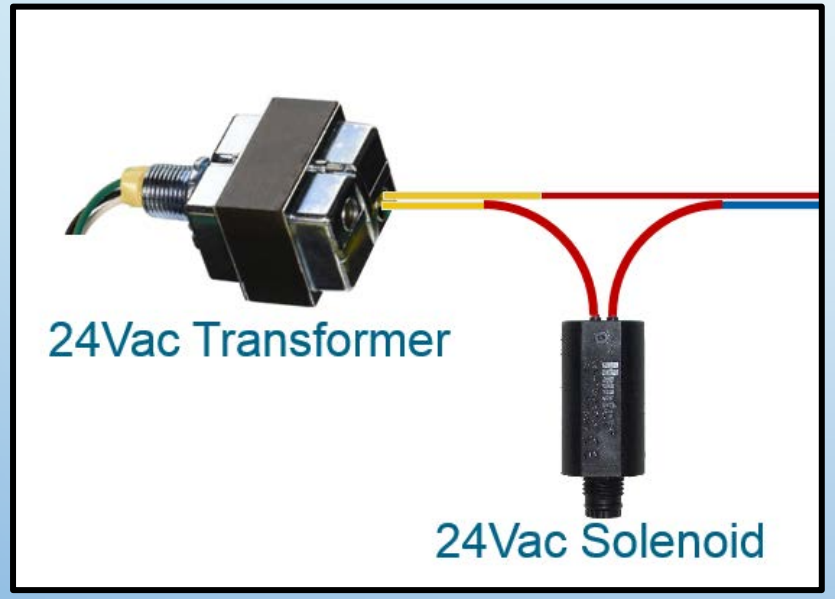
DECODER SYSTEM TROUBLESHOOTING TOOLS

FLUKE 117

Decoder
w/solenoid

Hunter
ICD-HP

DECODER SYSTEM TROUBLESHOOTING TOOLS



24Vac Power Source
w/optional solenoid

Armada
Pro 95

DECODER SYSTEM TROUBLESHOOTING TIPS

TYPES OF ISSUES

- Controller.
- 2-wire path.
- Decoder.
- Solenoid.
- Valve.

TYPES OF ISSUES

- Controller.
  - Alarms?
  - Test controller.
    - Output Voltage?

    (24Vac or 30-40Volts)

CONTROLLER TESTING

Use a Known-Working Decoder and Test Solenoid

TYPES OF ISSUES

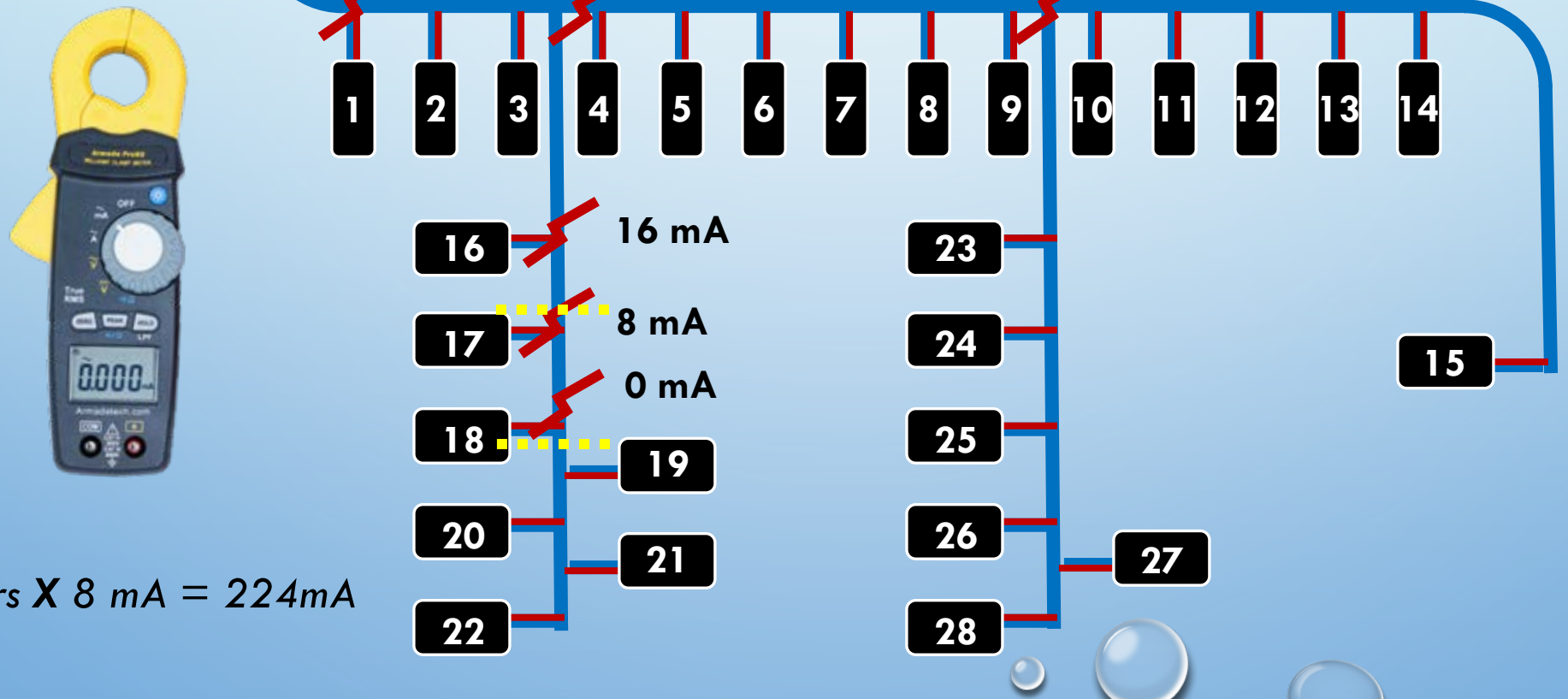
- 2-wire path.
  - Voltage?
    - Connections.
  - Single decoder
  - Multiple decoders
  - Test decoder.

2-WIRE PATH ~ VOLTAGE

- Voltage? (24Vac or 30-40Volts)
  - Connections.

2-Wire Path ~ Voltage

CHECKING VOLTAGE – "CLAMP METER"



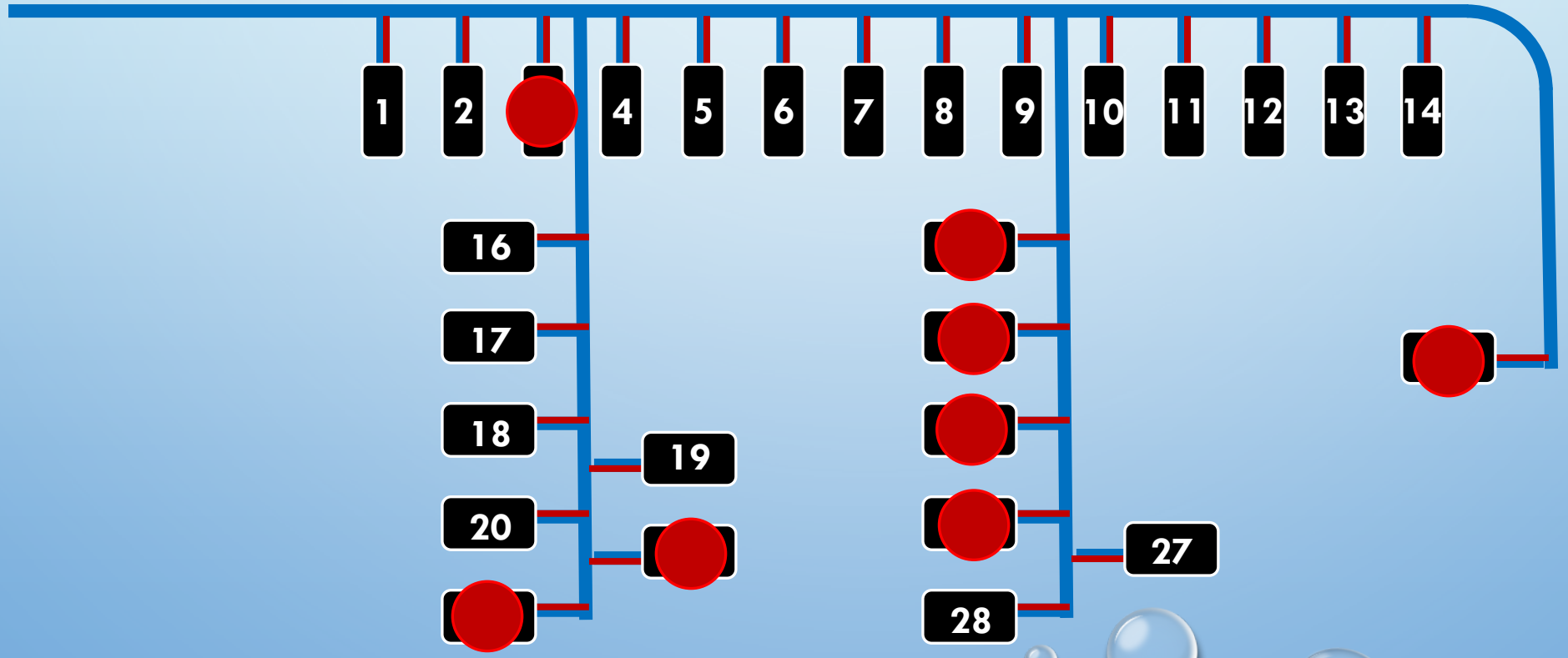
*28 decoders **X** 8 mA = 224mA*

2-WIRE PATH ~ DIAGNOSTICS

- An individual decoder.
- Multiple decoder.

2-Wire Path ~ Diagnostics

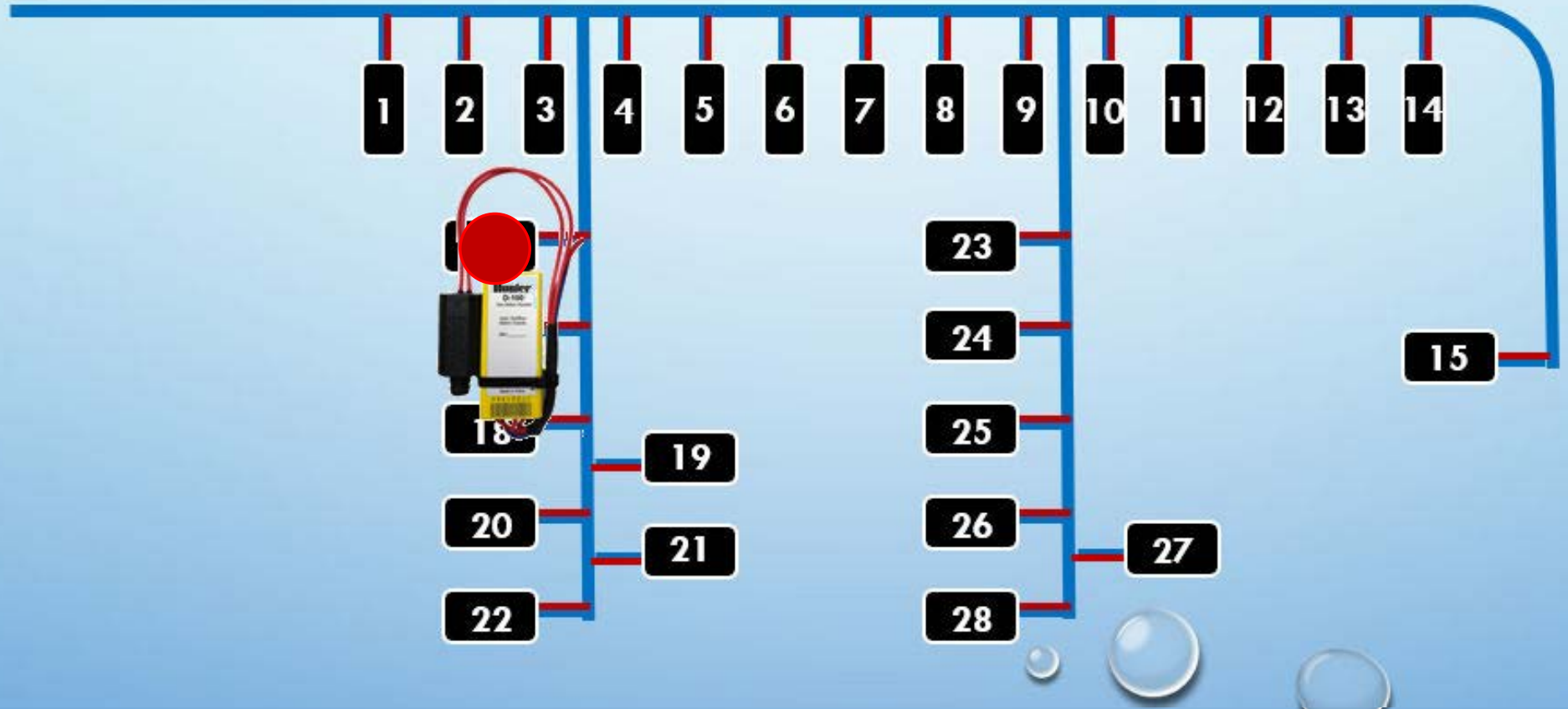
Decoder or wiring?



2-WIRE PATH ~ TEST DECODER

- Test decoder.

2-WIRE PATH ~ TEST DECODER



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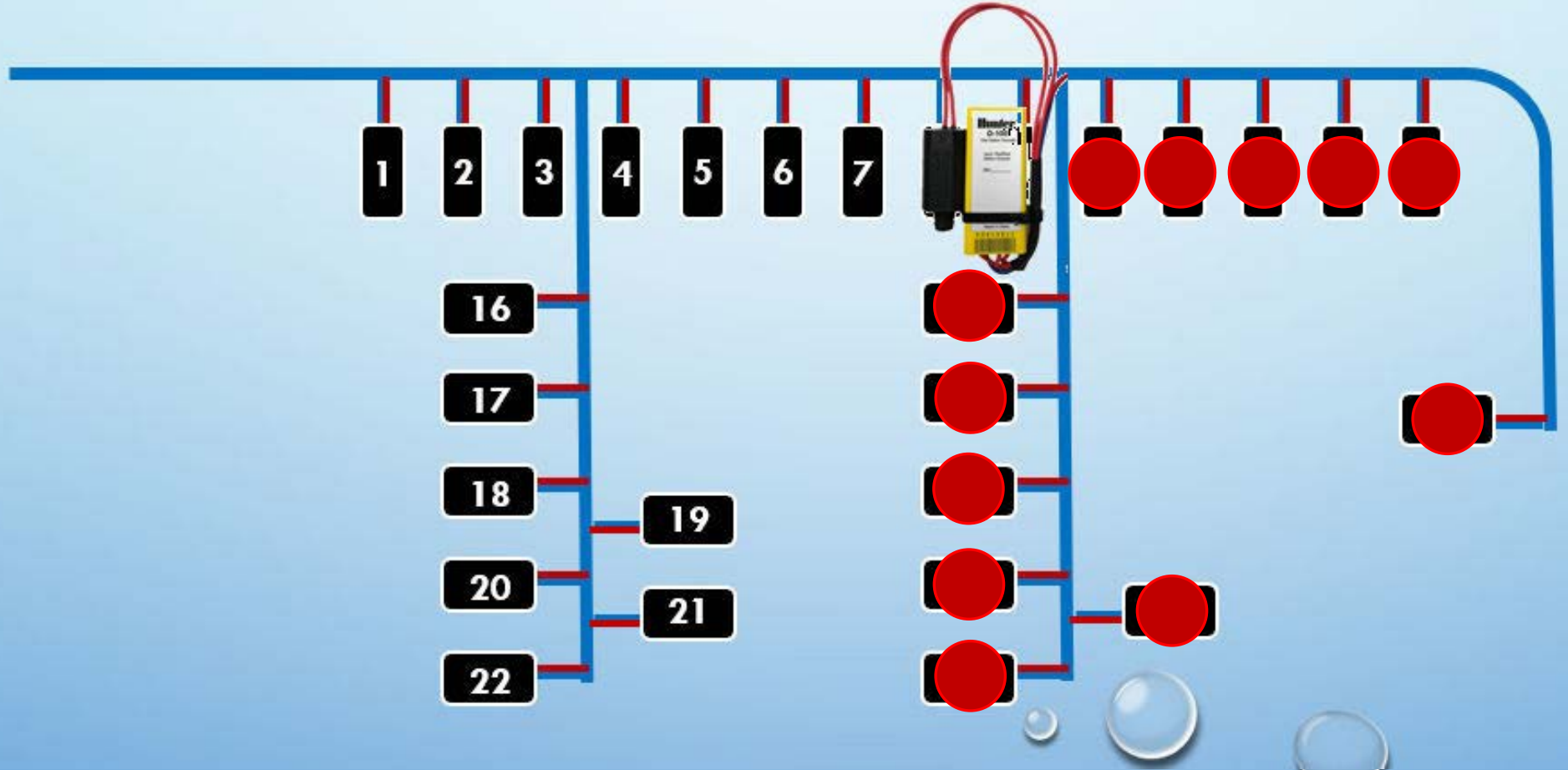
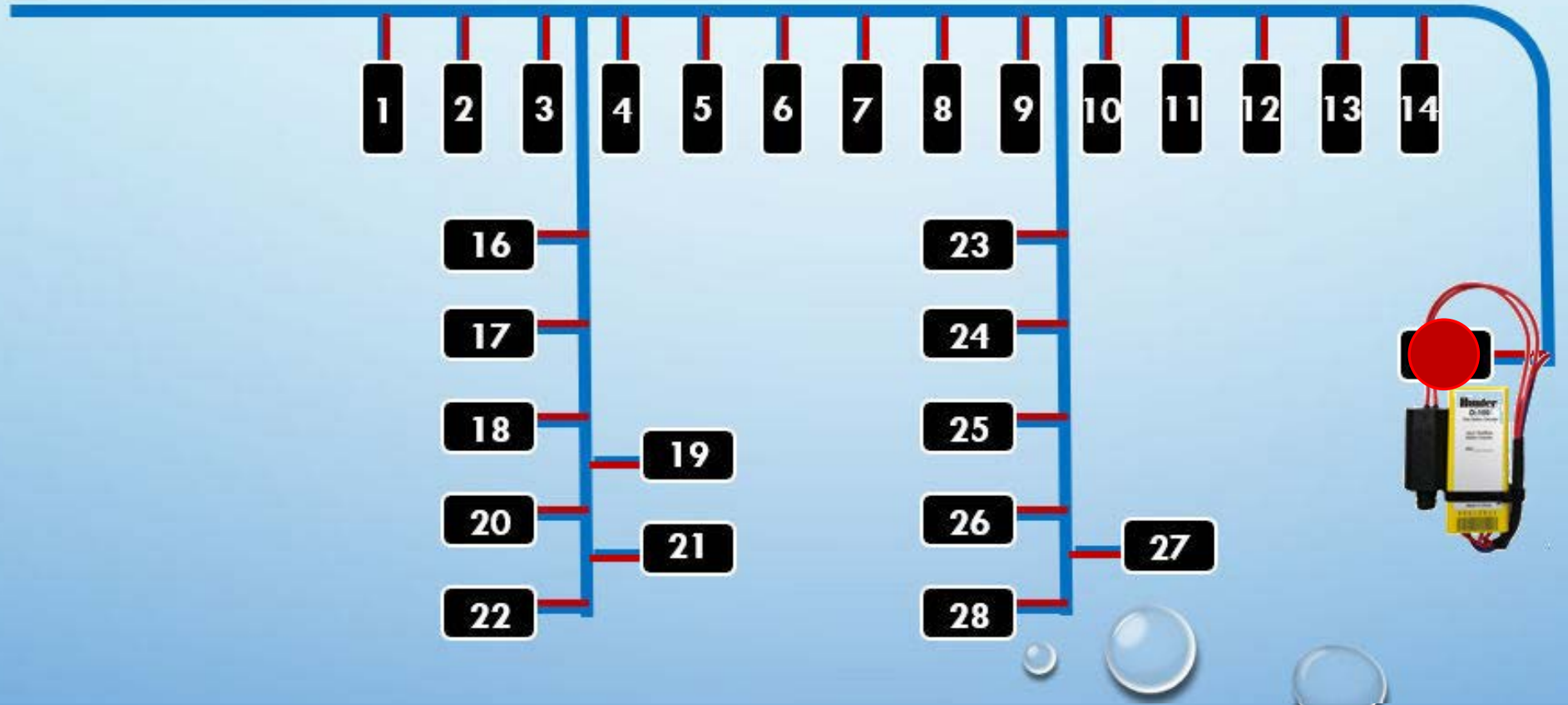


2-WIRE PATH ~ TEST DECODER



DECODERS

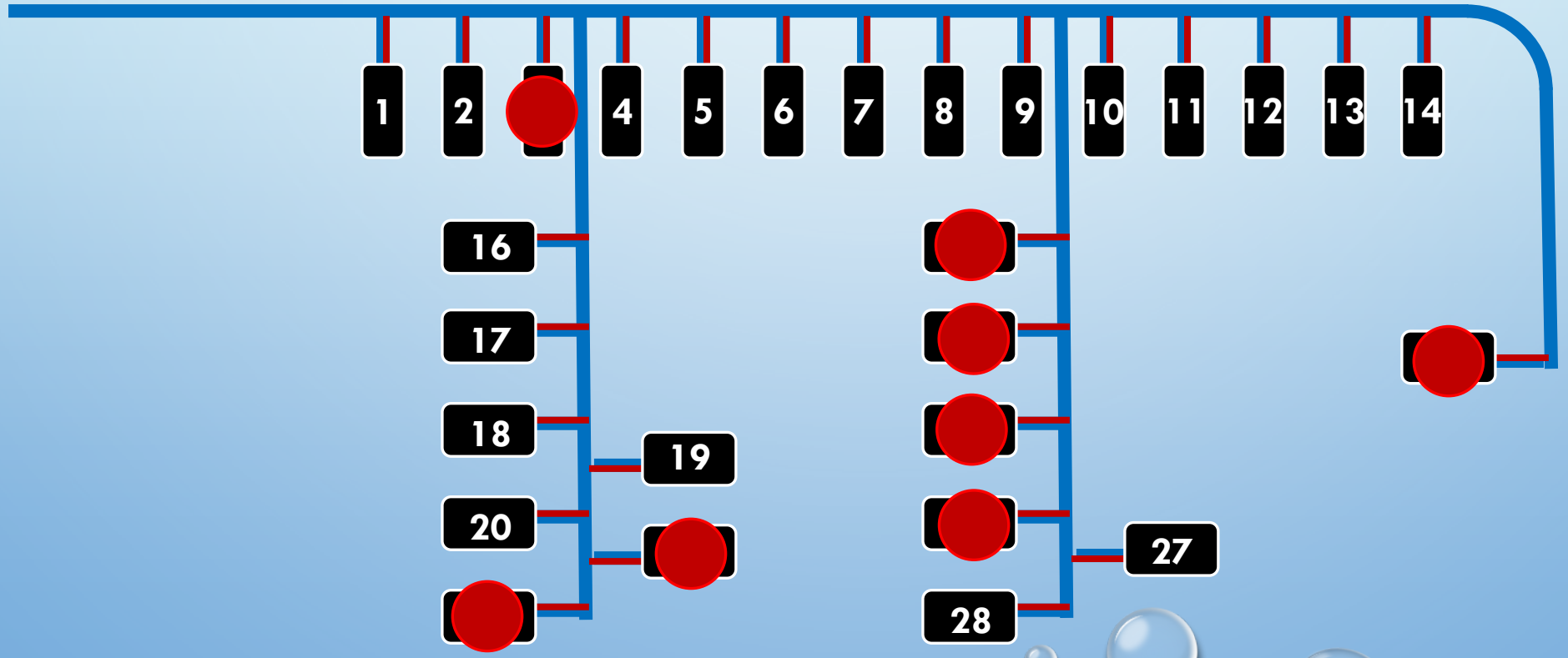
- Individual decoder?
- Multiple decoders?
- Shorted input?
- Shorted output?
- Constant output?
- Surge protector activated?
- Test decoder.

DECODERS

- Individual decoder? ~ single decoder issue.
- Multiple decoders? ~ 2-wire path issue or 1 multiple station decoder.
- Shorted input?
- Shorted output?
- Constant output?
- Surge protector activated?
- Test decoder.

Decoders

Decoder or wiring?



DECODERS

- Shorted input?
- Can bring down the entire 2-wire path.
    - 24Vac power source w/ Ma clamp meter.

DECODER ~ SHORTED INPUT

Total Amperage down the 2-wire path, including the decoder

Total Amperage down the 2-wire path, excluding the decoder

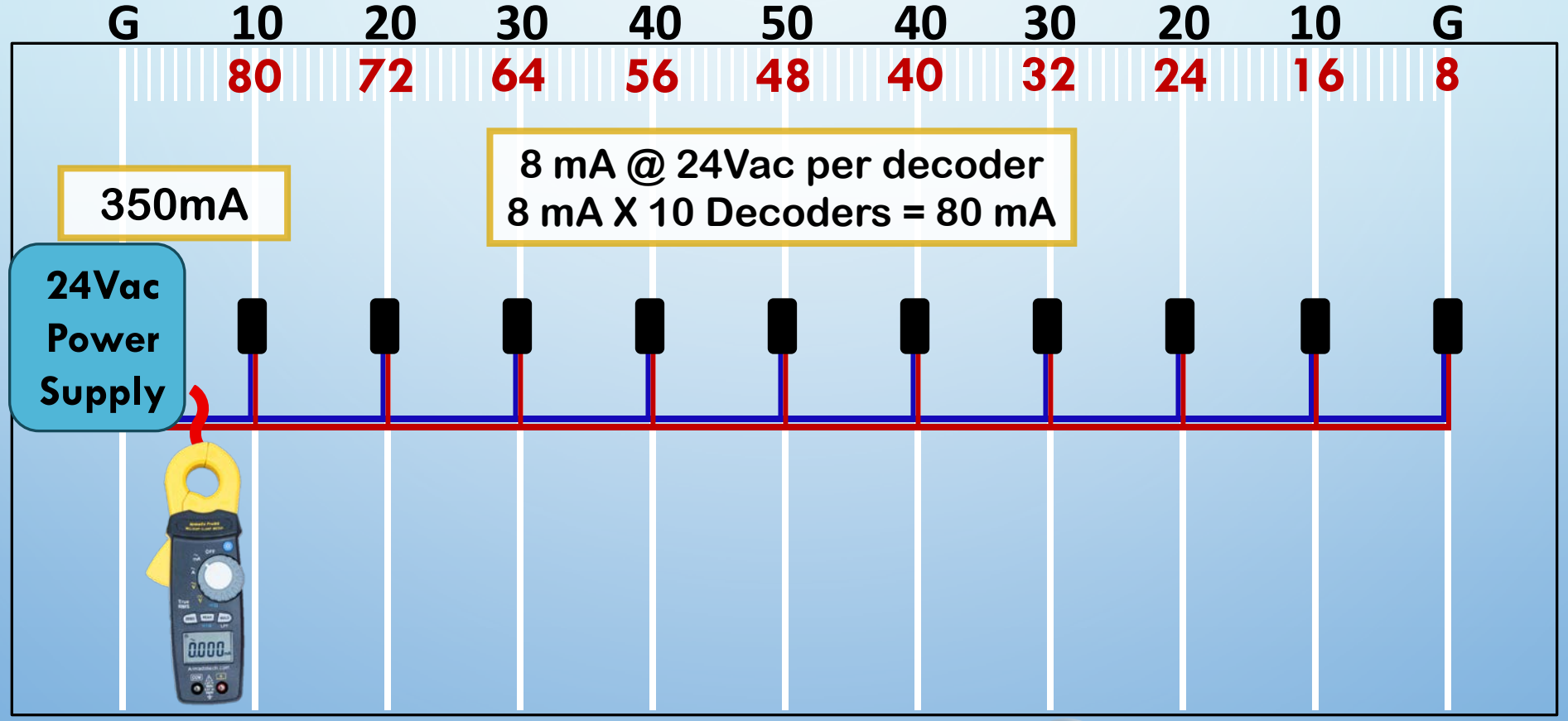
From controller

To field

Decoder Amperage ONLY

Decoder Lead

DECODER ~ SHORTED INPUT



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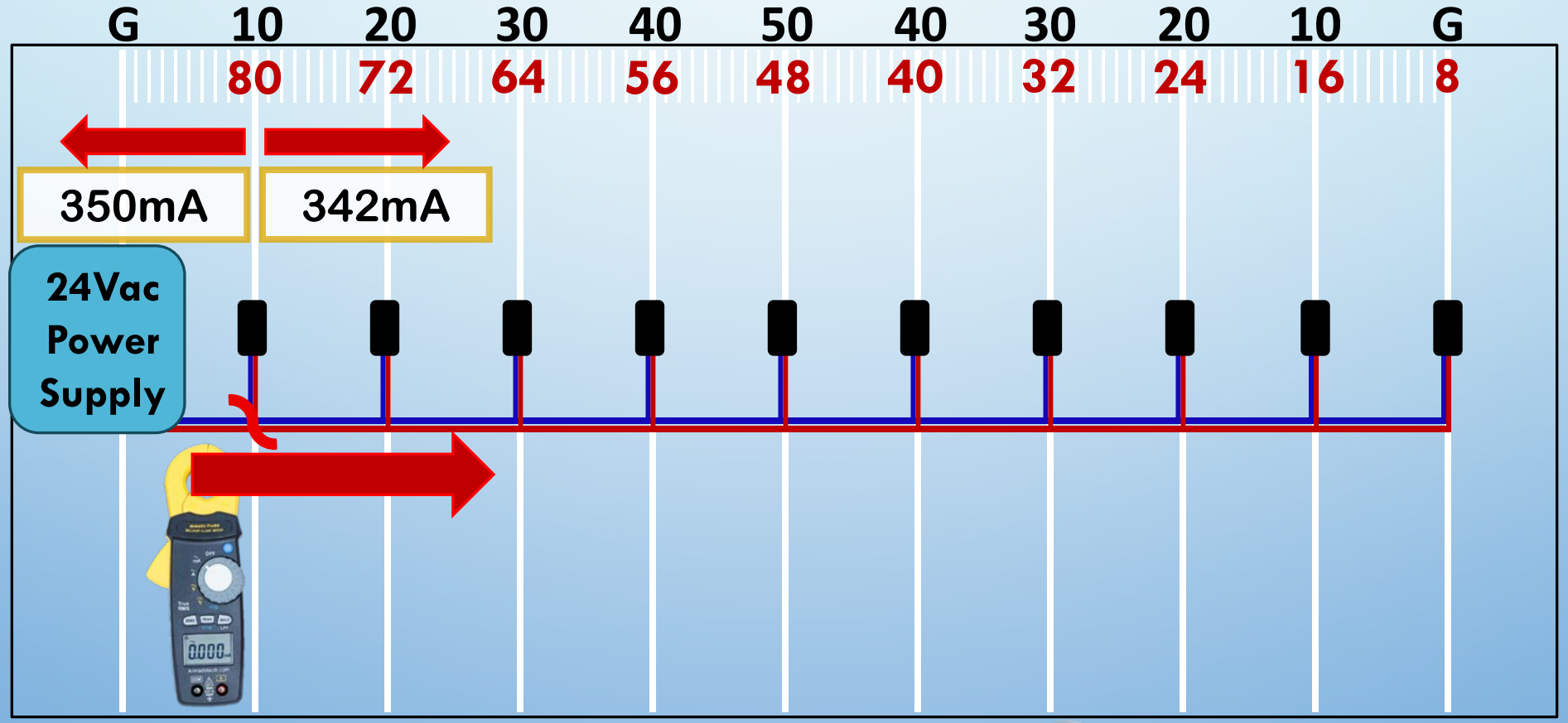

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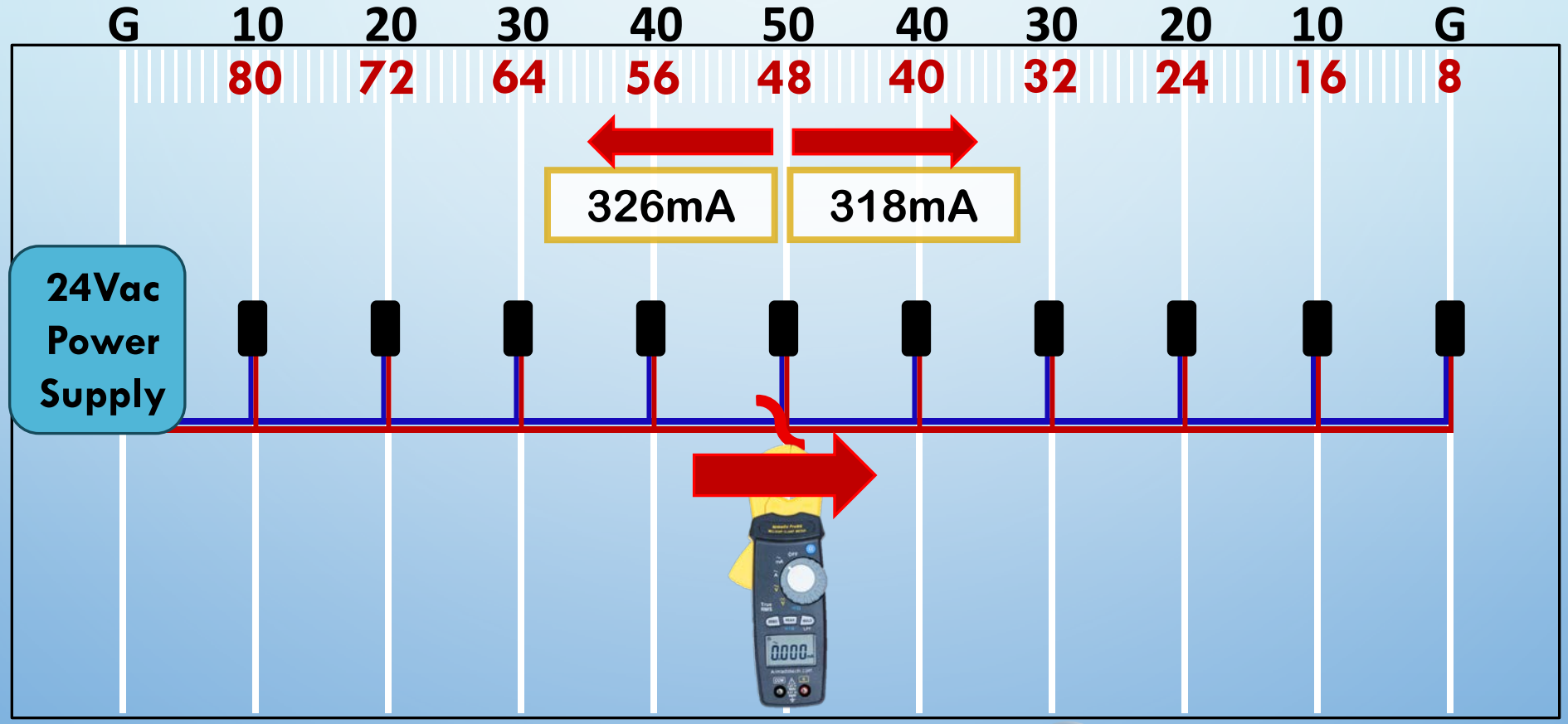

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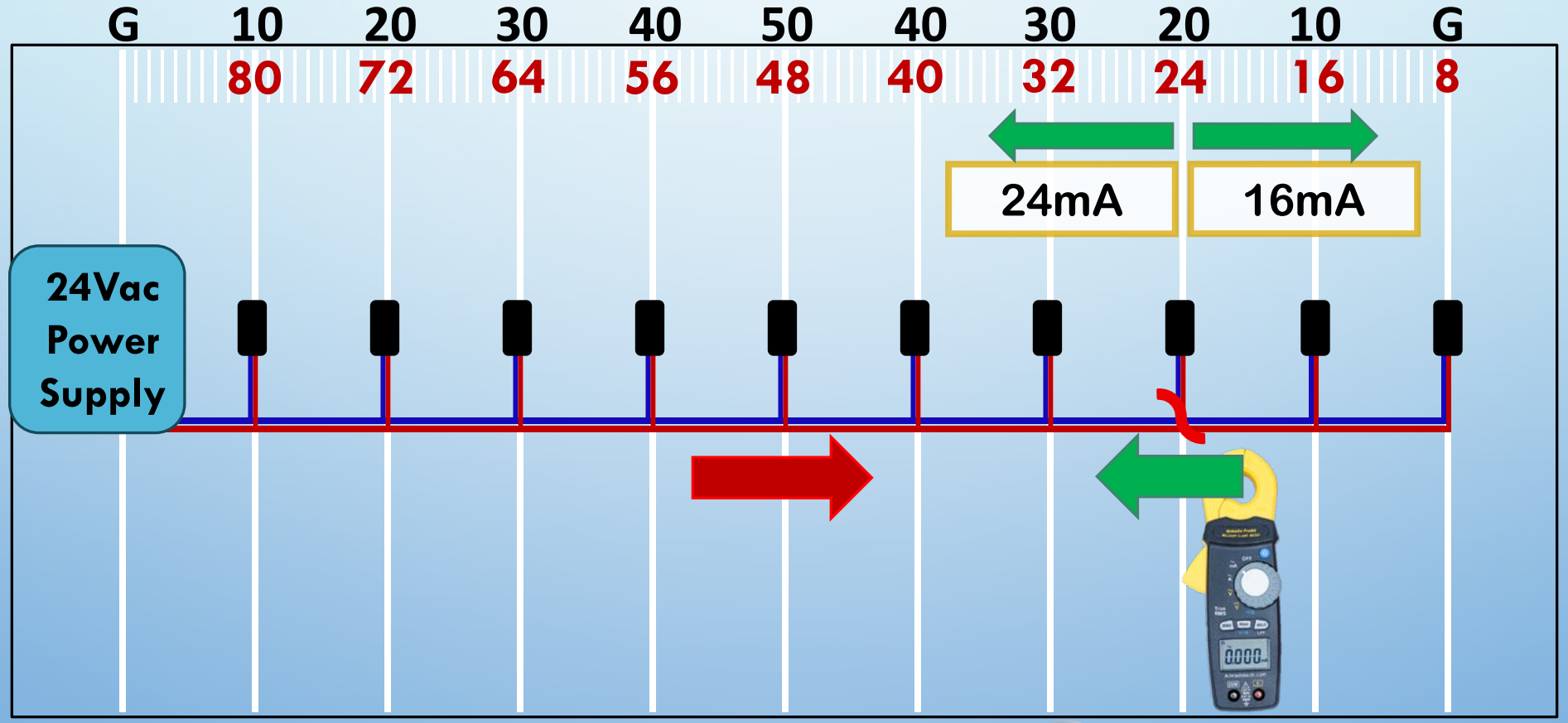

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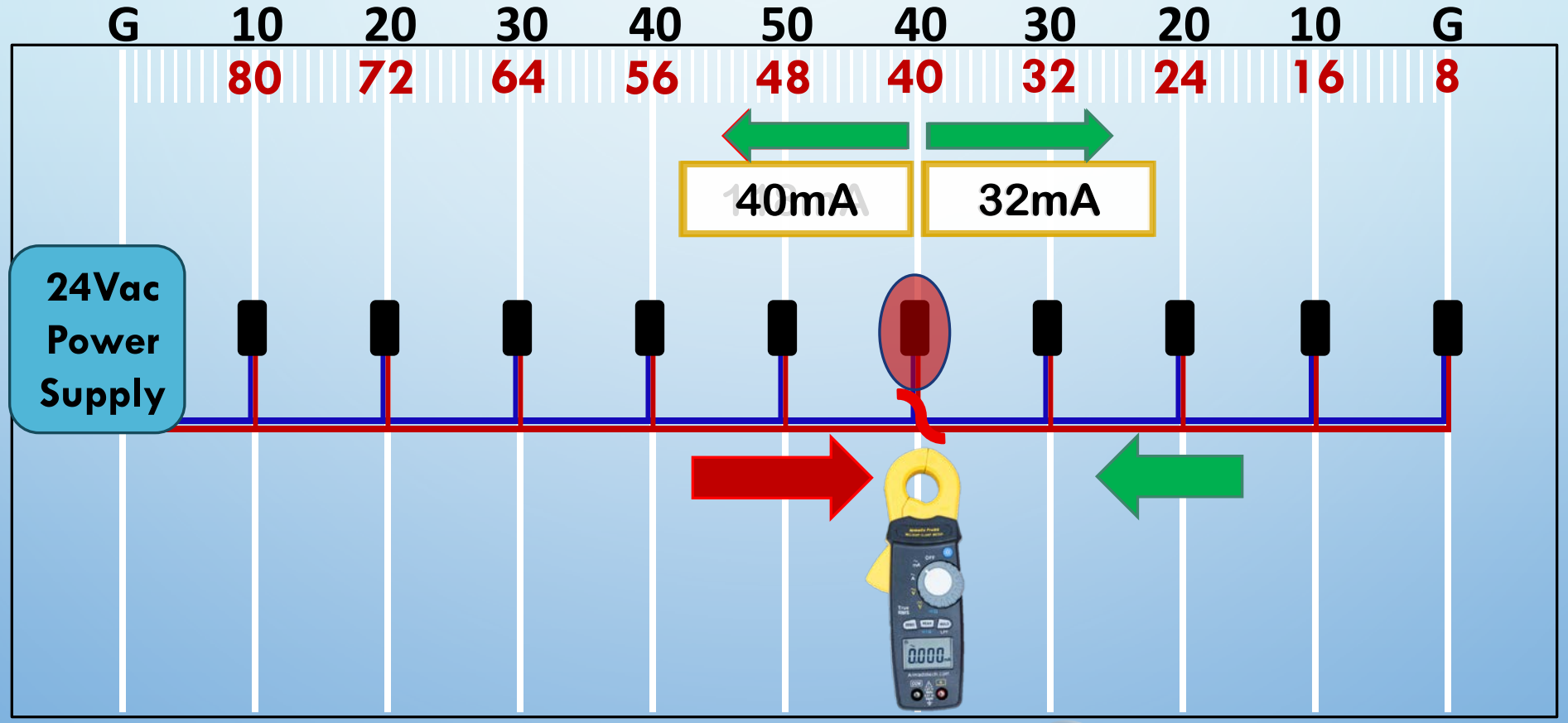

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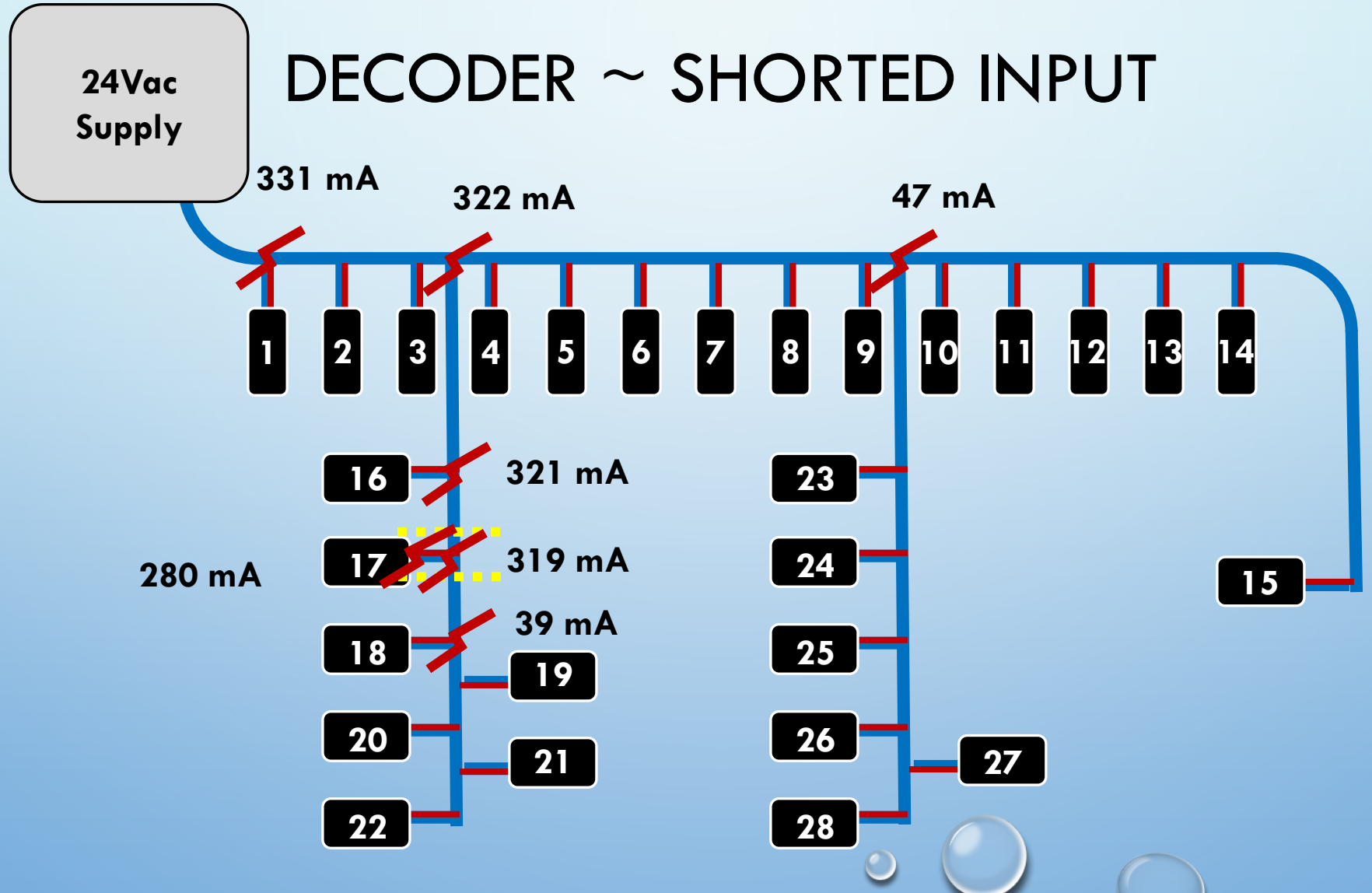

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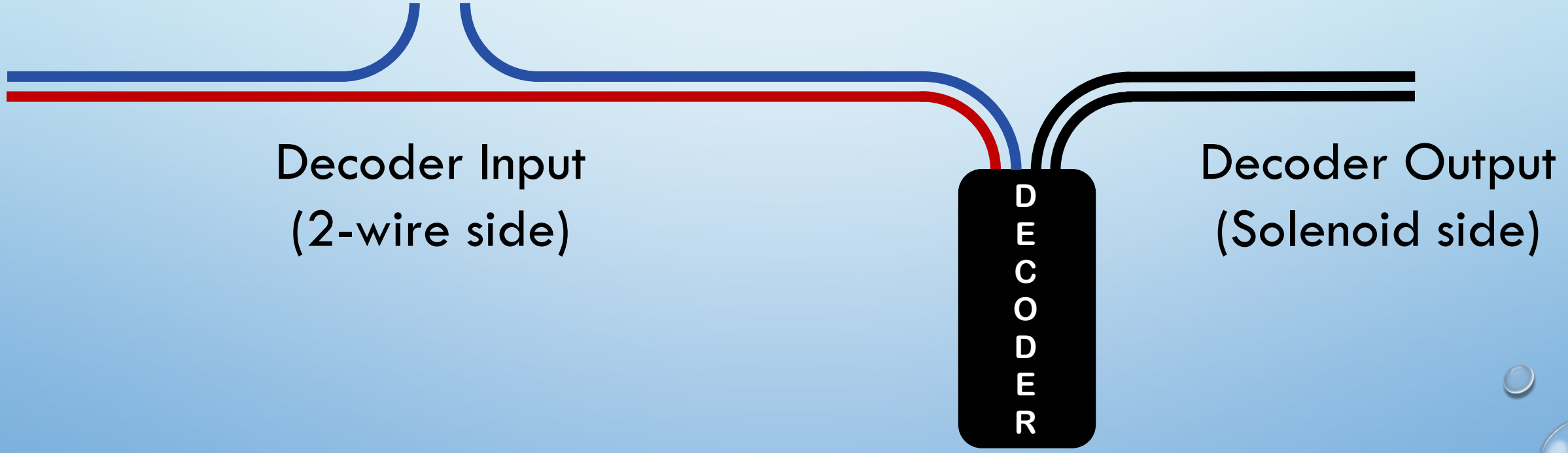
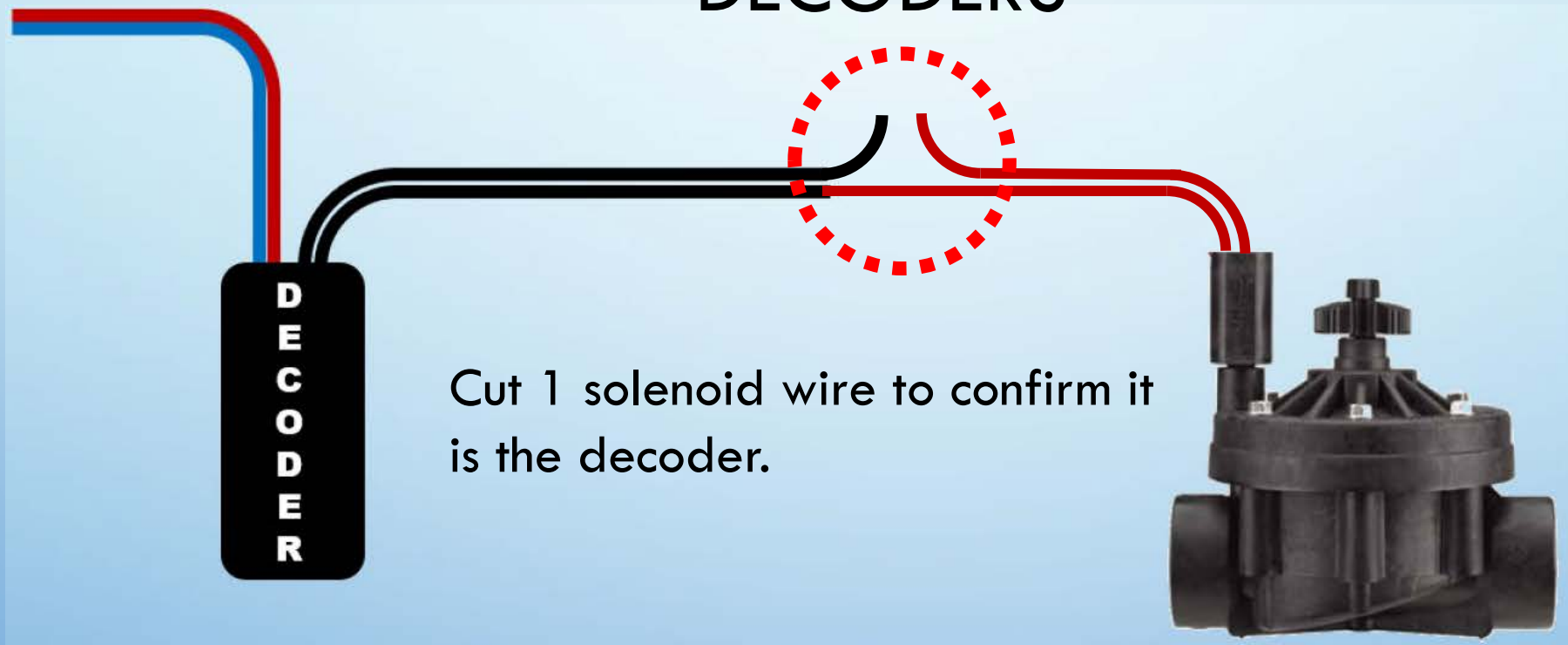


DECODERS

- Shorted output?
  - Usually only shorts out when station activated.
    - Cut 1 solenoid wire to confirm it is the decoder.

DECODERS



Cut 1 solenoid wire to confirm it is the decoder.

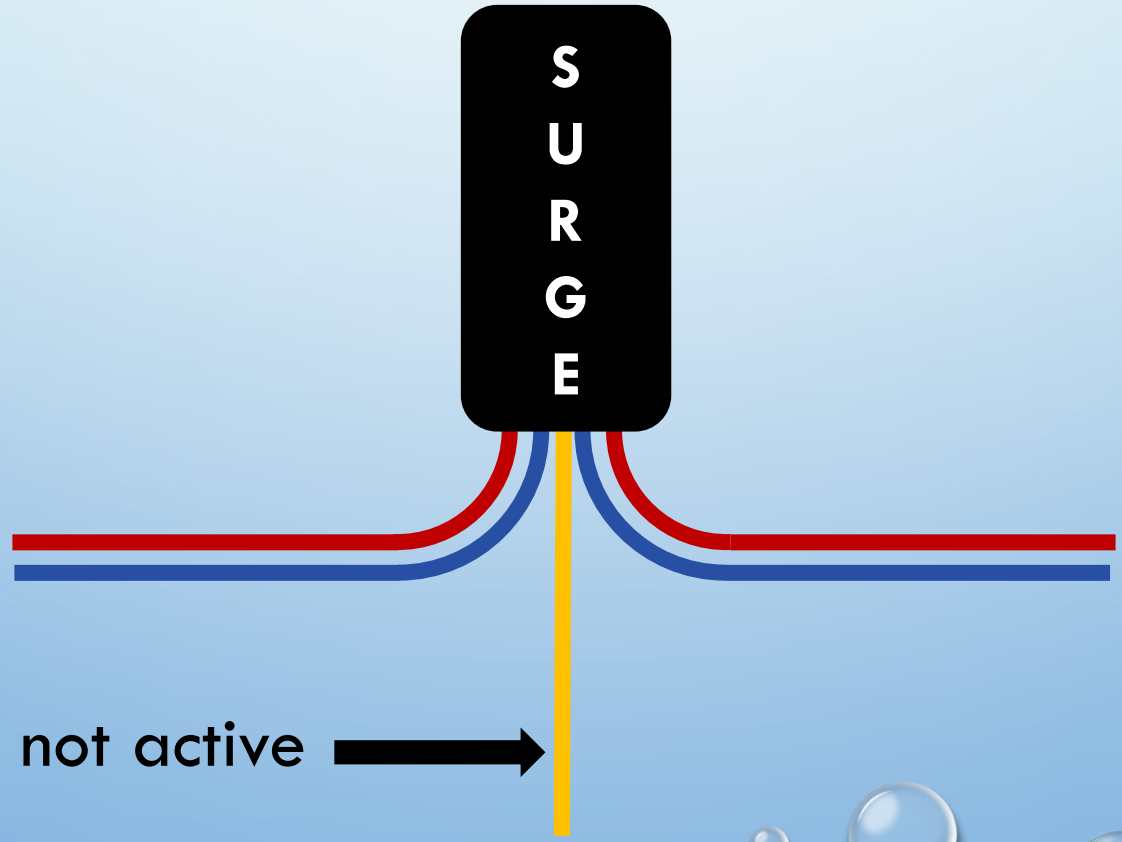
DECODERS

- Test decoder/solenoid.
  - To confirm issue.

DECODERS

- Surge protector activated?
  - Check with mA clamp meter

DECODERS



0 mA = not active

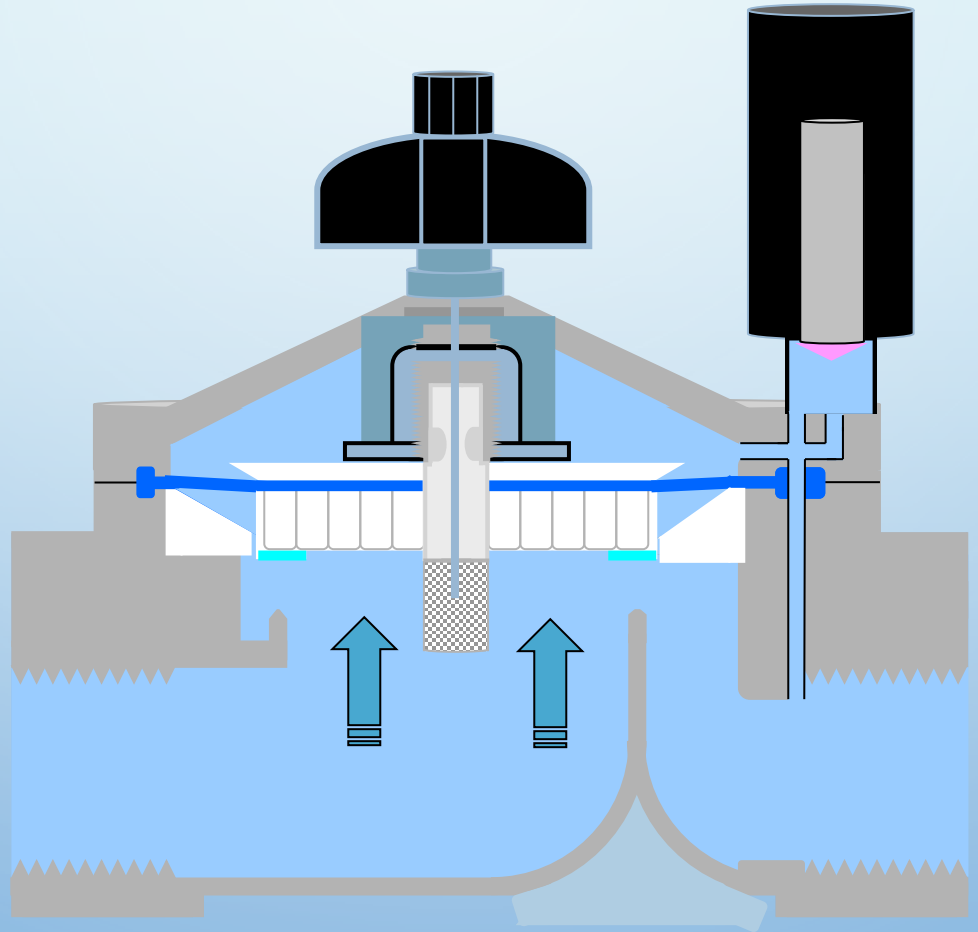
SOLENOIDS

- Resistance:
    - Shorted = 1 – 10 ohms
    - Normal = 20 – 59 ohms
    - Open = 60+ ohms

VALVES

- Hydraulics
- Valve won't open.
- Valve is weeping internally.
- Valve won't close.

VALVE HYDRAULICS



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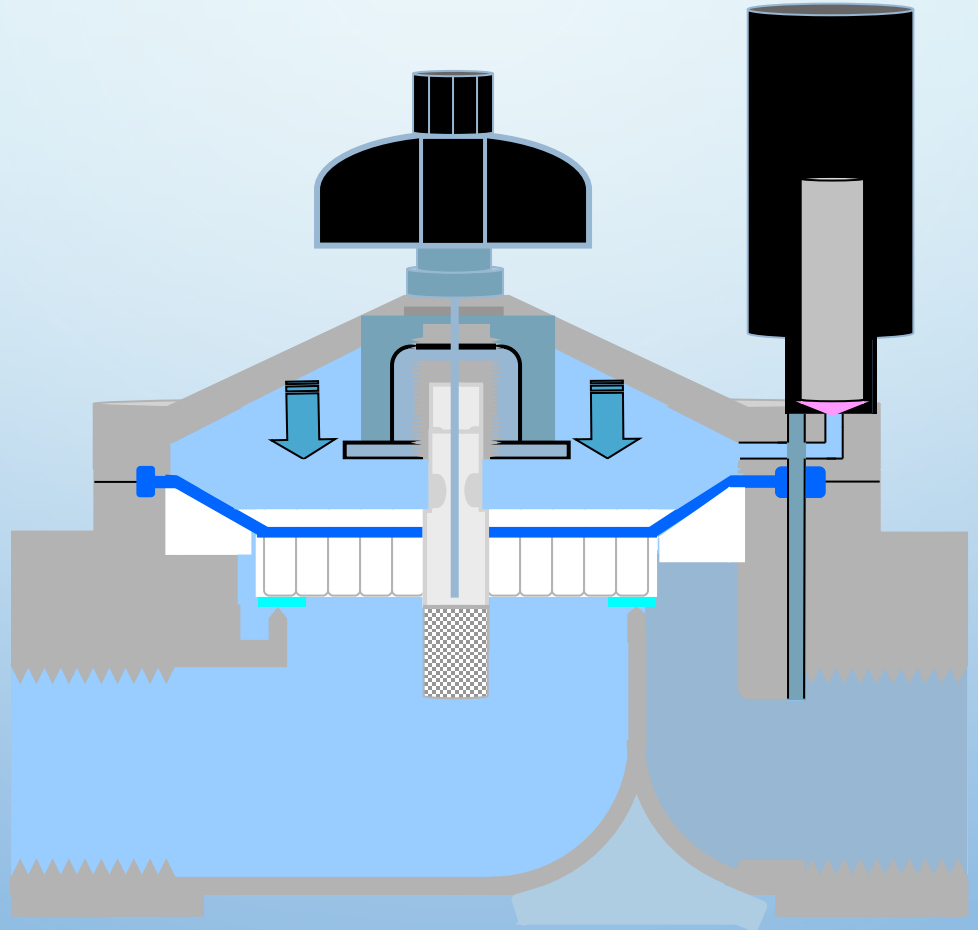

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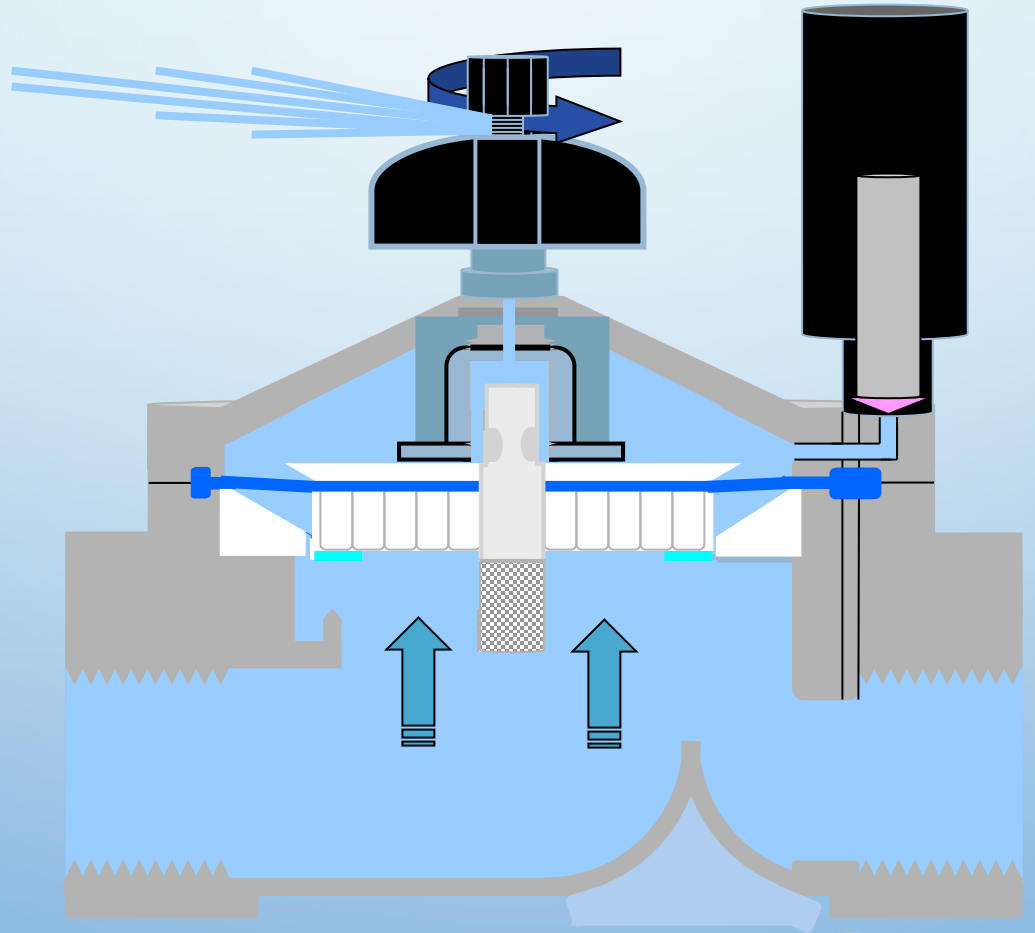

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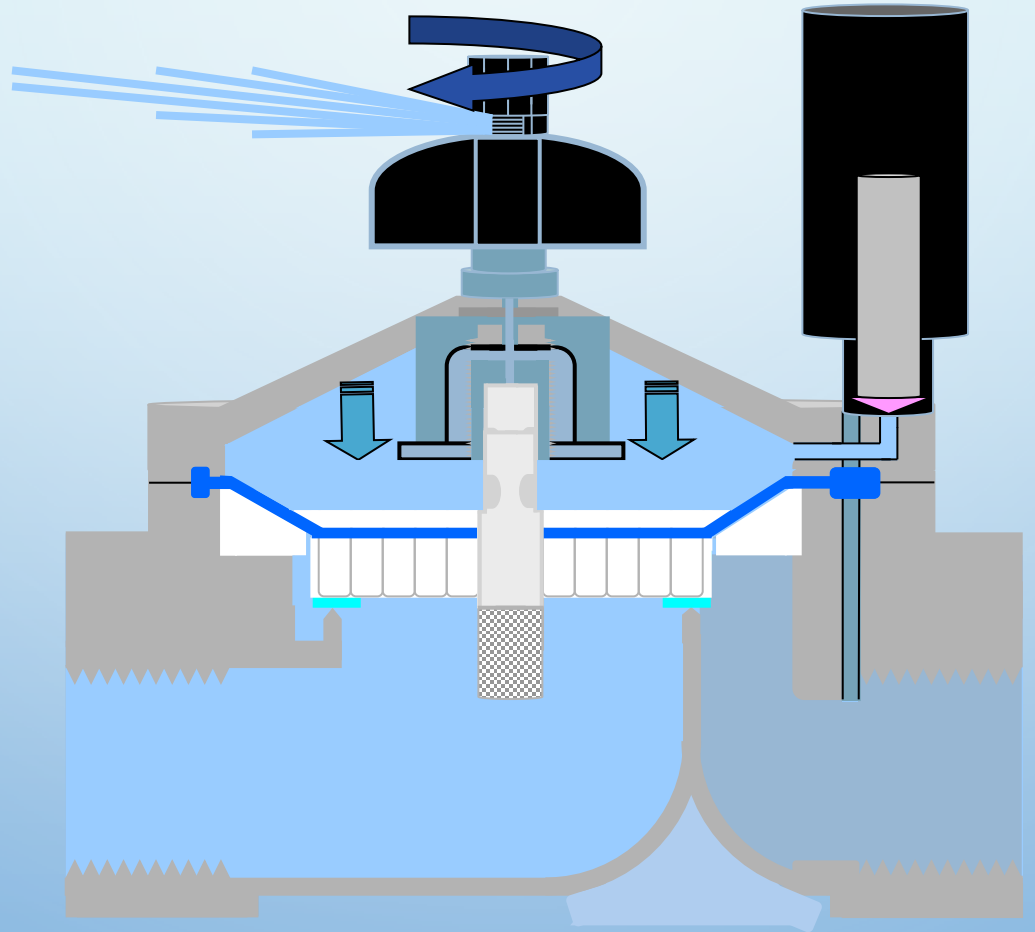


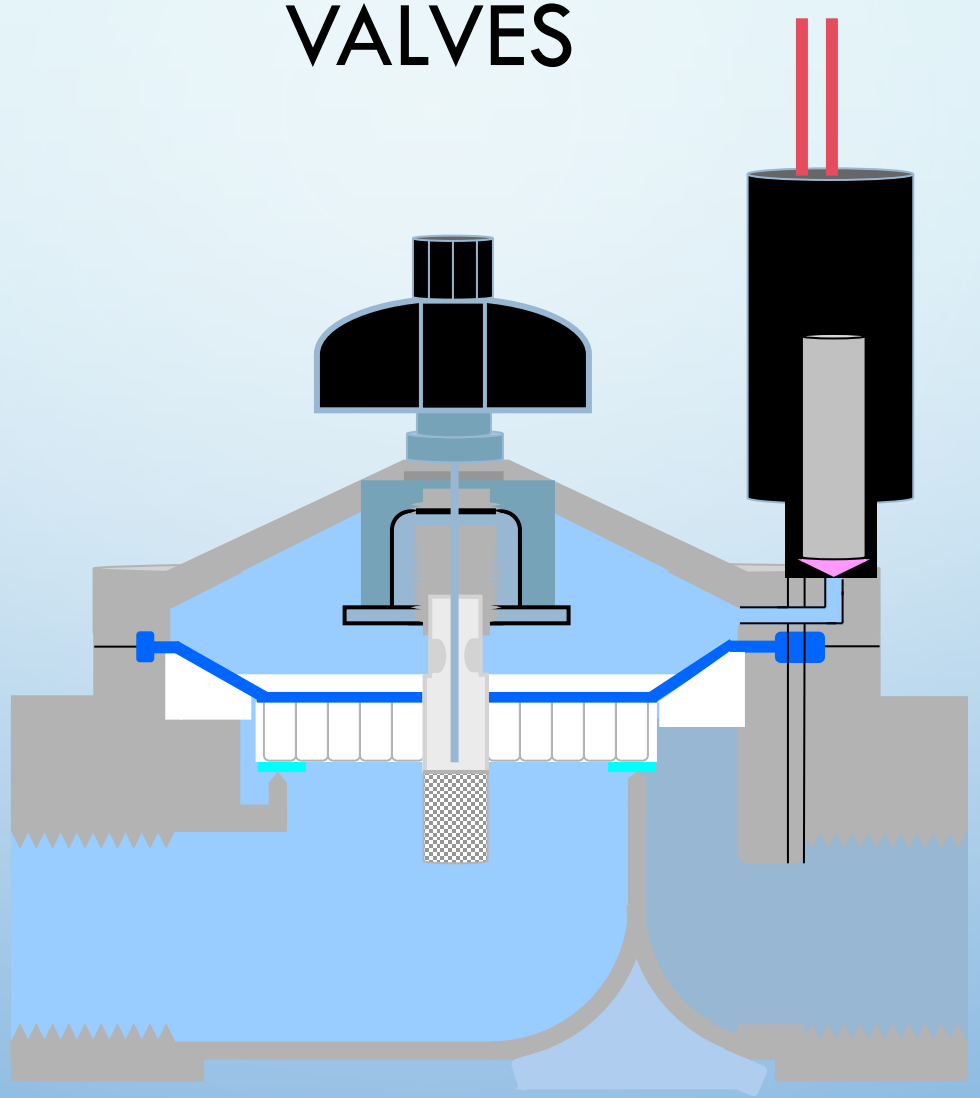
VALVES

- Not opening.
  - Flow control closed?
  - Solenoid?
  - Internal manual bleed?
  - Water source (external bleed)?
  - Plugged exhaust port?

VALVES

Valve won't open

- Flow control closed?
- Solenoid?
- Internal manual bleed?
- Water source? (external bleed)
- Plugged exhaust port?



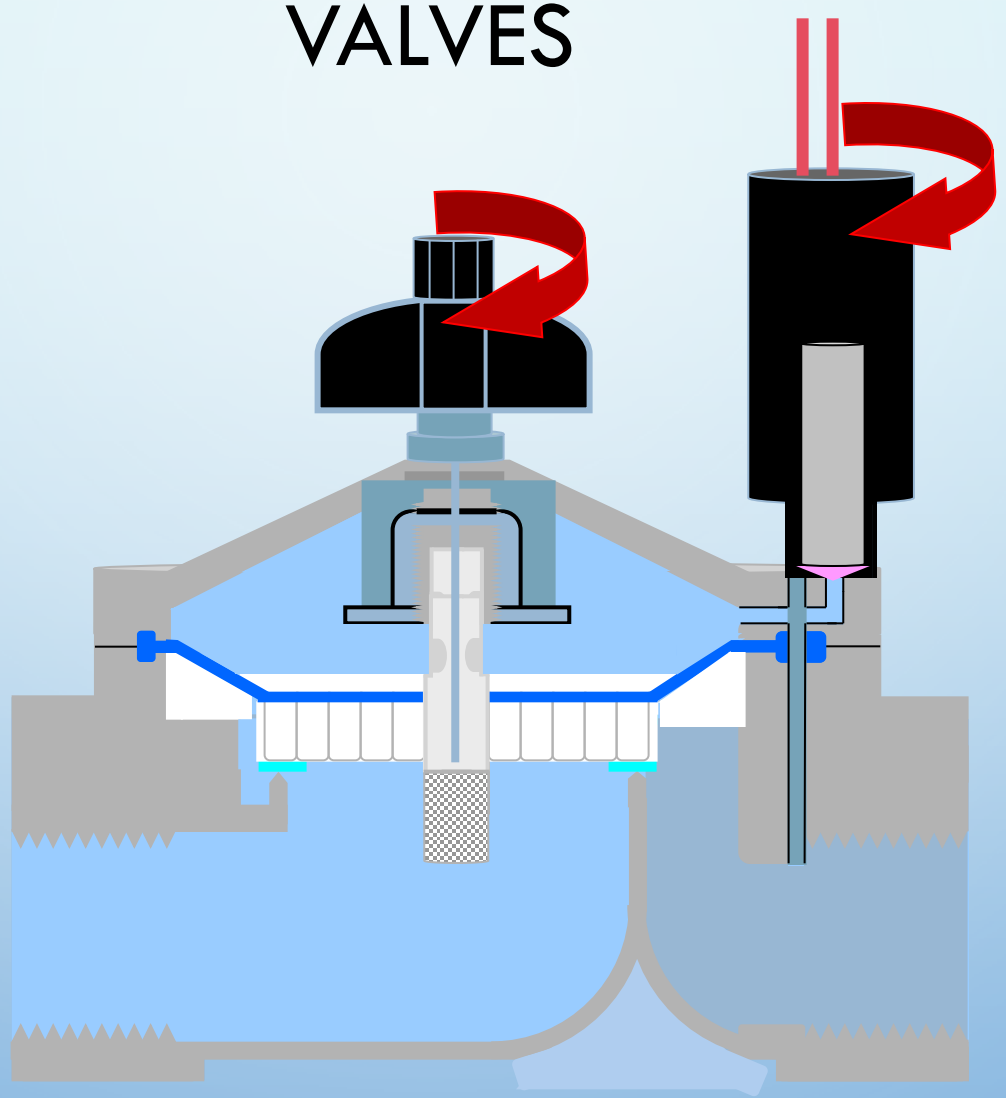
VALVES

- Weeping internally.
  - Solenoid tight?
  - Manual bleeds shut?
  - Debris in valve?
  - Cracked valve body?

VALVES

Weeping internally

- Solenoid tight?
- Manual bleeds tight?



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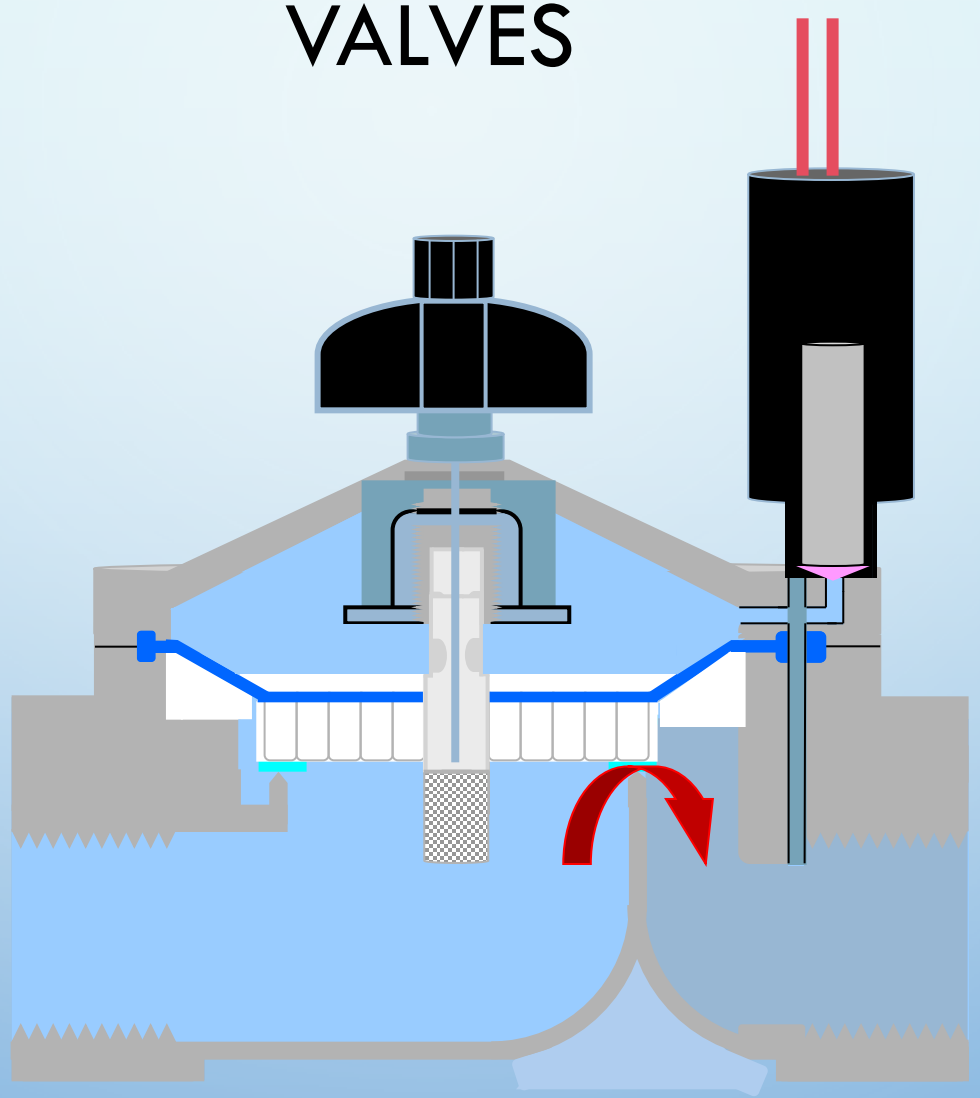

VALVES

Weeping internally

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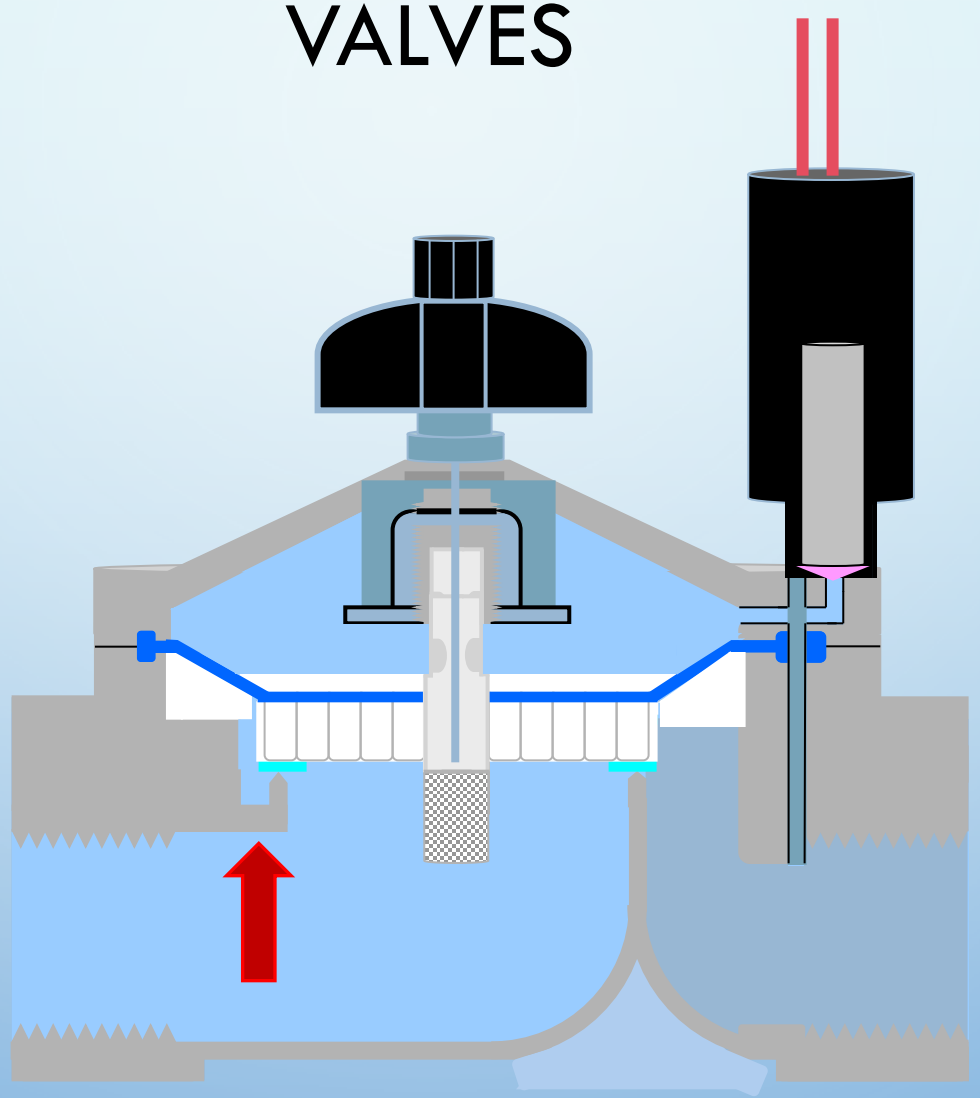


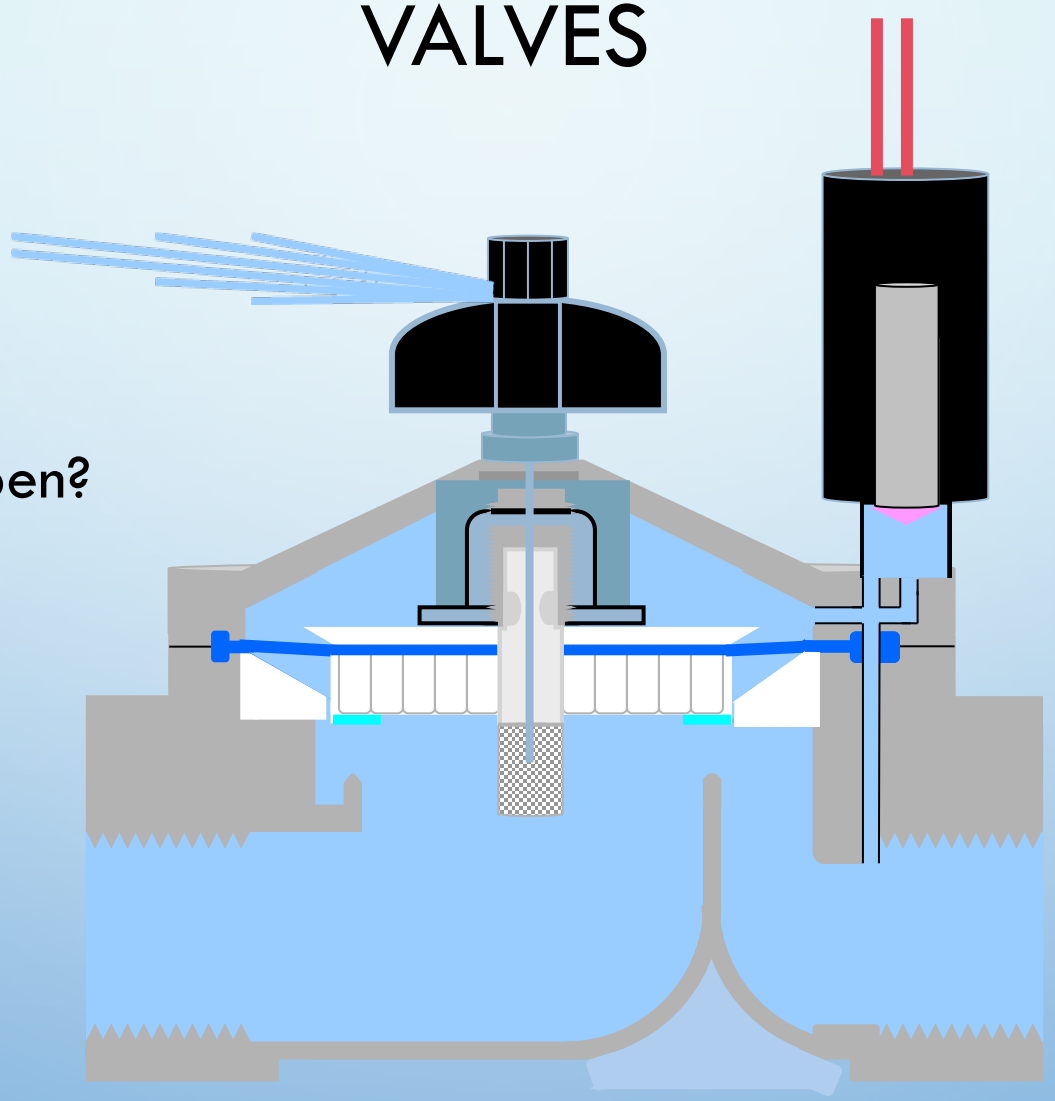
VALVES

- Not closing.
  - Manual bleeds open?
  - Debris in valve?

VALVES

Valve won't close

- Manual bleeds open?



VALVES

Valve won't close

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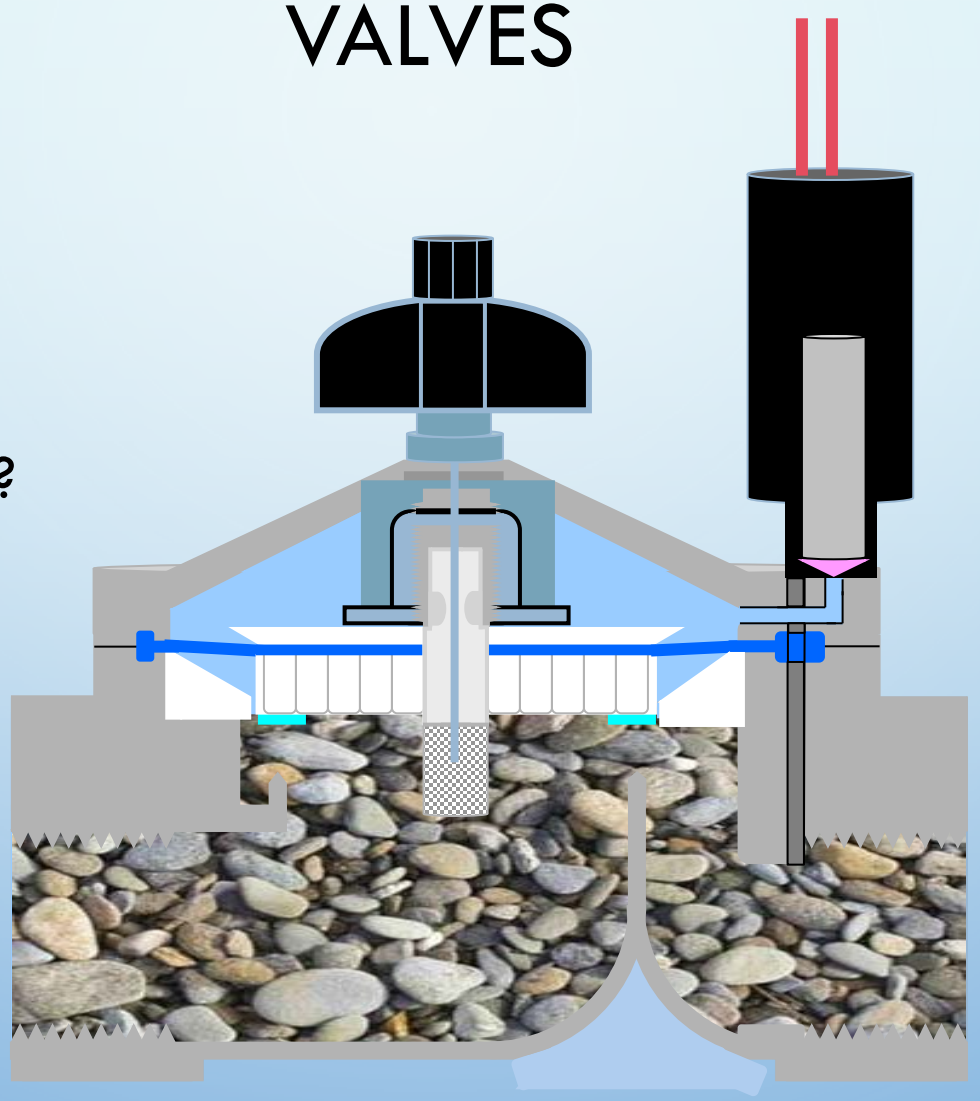

Questions

The Cheyenne Green Industry
and Hunter Industries
thanks you for your time today !!