# Standard Wiring Diagrams for Smart Model 20

## Coding System for AV Actuator Wiring Diagrams

There are 3 elements to the wiring codes used in AVA electric actuators:

<table>
<thead>
<tr>
<th>Control Wiring Code</th>
<th>Control Wiring Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 Wire system, single pole double throw, switching the live SPDT</td>
</tr>
<tr>
<td>2</td>
<td>3 Wire system, single pole single throw, make or break switch SPST</td>
</tr>
<tr>
<td>3</td>
<td>3 Wire system, 2 x single pole single throw, make or break switches SPST x 2</td>
</tr>
<tr>
<td>4</td>
<td>4 Wire System, 2 x single pole single throw, make or break switches SPST x 2</td>
</tr>
<tr>
<td>X</td>
<td>Other factory special wiring</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feedback Type Code</th>
<th>Feedback Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3 Wire system, cam driven volt free single pole double throw switch SPDT</td>
</tr>
<tr>
<td>2</td>
<td>2 Wire system connected to motor switches to give powered output</td>
</tr>
<tr>
<td>3</td>
<td>3 Wire system, 10kΩ potentiometer</td>
</tr>
<tr>
<td>4</td>
<td>3 Wire System, volt free relay switch (relay for open, relay for closed)</td>
</tr>
<tr>
<td>X</td>
<td>Other factory special feedback</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Alarm Code</th>
<th>Alarm</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No alarm</td>
</tr>
<tr>
<td>A</td>
<td>Relay powered alarm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AVA Code System</th>
<th>Wiring Created by the AVA Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>E 1 4 0</td>
<td>3 Wire, SPDT control with relays for open and for closed position feedback</td>
</tr>
<tr>
<td>F 1 4 A</td>
<td>3 Wire, SPDT control with relays for open and for closed position feedback with alarm output</td>
</tr>
<tr>
<td>G 2 4 0</td>
<td>3 Wire, SPST control with relays for open and for closed position feedback</td>
</tr>
<tr>
<td>H 2 4 A</td>
<td>3 Wire, SPST control with relays for open and for closed position feedback with alarm output</td>
</tr>
<tr>
<td>J 3 4 0</td>
<td>3 Wire, 2 x SPST control with relays for open and for closed position feedback</td>
</tr>
<tr>
<td>K 3 4 A</td>
<td>3 Wire, 2 x SPST control with relays for open and for closed position feedback &amp; alarm output</td>
</tr>
<tr>
<td>L 3 1 A</td>
<td>3 Wire, 2 x SPST control with cam driven volt free SPDT feedback with alarm output</td>
</tr>
<tr>
<td>M 4 X 0</td>
<td>4 Wire, 2 x SPST control</td>
</tr>
<tr>
<td>N X 4 A</td>
<td>4 Wire, 2 x SPST control with relays for open and for closed position feedback &amp; alarm output</td>
</tr>
<tr>
<td>O-V</td>
<td>2 Wire permanent connection for all modulating control options</td>
</tr>
<tr>
<td>W</td>
<td>2 Wire permanent connection for Modbus communication option</td>
</tr>
<tr>
<td>X</td>
<td>2 Wire permanent connection for Canbus communication option</td>
</tr>
<tr>
<td>Y</td>
<td>2 Wire permanent connection for Wireless option</td>
</tr>
<tr>
<td>Z</td>
<td>2 Wire permanent connection for Timer option</td>
</tr>
<tr>
<td>1-6</td>
<td>2 Wire permanent connection for all modulating control options with alarm output</td>
</tr>
</tbody>
</table>

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QUARTER TURN ELECTRIC ACTUATOR

STANDARD WIRING DIAGRAMS FOR SMART MODEL 20

Note: All AVA Smart Model 20 actuators are supplied pre-wired with a cable approximately 0.8m long

ON-OFF [OPEN / CLOSE]

WIRING DIAGRAM: E

AVA REFERENCE: E (Code 1-4-0)
CONTROL TYPE: SPDT (Single pole, double throw)
TO OPEN: Connect live / +ve to the black cable (BK)
TO CLOSE: Disconnect from BK, connect to red cable (RD)
END OF TRAVEL CONFIRMATION: Yes, by internal electronic relay. Contactor loading capacity 0.1A for 24VDC, 50mA for 240VAC.
FAULT ALARM: Available, see wiring diagram ‘F’
NOTES: End of travel confirmation only available when external power is connected to the actuator.

Note: Standard UK stock wiring configuration

WIRING DIAGRAM: F

AVA REFERENCE: F (Code 1-4-A)
CONTROL TYPE: SPDT (Single pole, double throw)
TO OPEN: Connect live / +ve to the black cable (BK)
TO CLOSE: Disconnect from BK, connect to red cable (RD)
END OF TRAVEL CONFIRMATION: Yes, by internal electronic relay. Contactor loading capacity 0.1A for 24VDC, 50mA for 240VAC.
FAULT ALARM: Available, see wiring diagram ‘H’
NOTES: End of travel confirmation and fault indication are only available when external power is connected to the actuator.

WIRING DIAGRAM: G

AVA REFERENCE: G (Code 2-4-0)
CONTROL TYPE: SPST (Single pole, single throw)
TO OPEN: Connect live / +ve to black cable (BK)
TO CLOSE: Disconnect from BK
END OF TRAVEL CONFIRMATION: Yes, by internal electronic relay. Contactor loading capacity 0.1A for 24VDC, 50mA for 240VAC.
FAULT ALARM: Available, see wiring diagram ‘H’
NOTES: End of travel confirmation is only available when external power is connected to the actuator.

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ON-OFF [OPEN / CLOSE]

WIRING DIAGRAM: H

AVA REFERENCE: H (Code 2-4-A)

CONTROL TYPE: SPST (Single pole, single throw)

TO OPEN: Connect live / +ve to black cable (BK)

TO CLOSE: Disconnect from BK

END OF TRAVEL CONFIRMATION: Yes, by internal electronic relay. Contactor loading capacity 0.1A for 24VDC, 50mA for 240VAC.

FAULT ALARM: Available, see wiring diagram ‘F’

NOTES: End of travel confirmation is only available when external power is connected to the actuator.

WIRING DIAGRAM: E - Failsafe

AVA REFERENCE: Code E Failsafe (1-4-0-Fail [close or open])

CONTROL TYPE: SPDT (Single pole, double throw)

TO OPEN: Connect live / +ve to the black cable (BK)

TO CLOSE: Disconnect from BK, connect to red cable (RD)

END OF TRAVEL CONFIRMATION: Yes, by internal electronic relay. Contactor loading capacity 0.1A for 24VDC, 50mA for 240VAC.

FAULT ALARM: Available, see wiring diagram ‘F’

NOTES: End of travel confirmation only available when external power is connected to the actuator.

WIRING DIAGRAM: G - Failsafe

AVA REFERENCE: Code G Failsafe (2-4-0-Fail [close or open])

CONTROL TYPE: SPST (Single pole, single throw)

TO OPEN: Connect live / +ve to black cable (BK)

TO CLOSE: Disconnect from BK

END OF TRAVEL CONFIRMATION: Yes, by internal electronic relay. Contactor loading capacity 0.1A for 24VDC, 50mA for 240VAC.

FAULT ALARM: Available, see wiring diagram ‘H’

NOTES: End of travel confirmation is only available when external power is connected to the actuator.

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STANDARD WIRING DIAGRAMS FOR SMART MODEL 20

QUARTER TURN ELECTRIC ACTUATOR

Note: All AVA Smart Model 20 actuators are supplied pre-wired with a cable approximately 0.8m long

MODULATING 0-20mA or 4-20mA

WIRING DIAGRAM: O & P

AVA REFERENCE: O & P
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL SIGNAL I/O: For Ref: ‘O’ 0-20mA
CONTROL SIGNAL I/O: For Ref: ‘P’ 4-20mA
FAULT ALARM: No, but available as an option. See wiring diagram ref: 1 or 2
ON LOSS OF SIGNAL: ‘O’ Closes
‘P’ Can be configured to open, close, or stay put.
ON LOSS OF POWER: Stays put.

WIRING DIAGRAM: O & P - Failsafe

AVA REFERENCE: O & P
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL SIGNAL I/O: For Ref: ‘O’ 0-20mA
CONTROL SIGNAL I/O: For Ref: ‘P’ 4-20mA
FAULT ALARM: No, but available as an option. See wiring diagram ref: 1 or 2 Failsafe
ON LOSS OF SIGNAL: ‘O’ Closes
‘P’ Can be configured to open, close, or stay put.
ON LOSS OF POWER: Can be configured to close, or open.

WIRING DIAGRAM: O & P - Failsafe & Alarm

AVA REFERENCE: OA & PA
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL SIGNAL I/O: For Ref: ‘O’ 0-20mA
CONTROL SIGNAL I/O: For Ref: ‘P’ 4-20mA
FAULT ALARM: Yes
ON LOSS OF SIGNAL: ‘O’ Closes
‘P’ Can be configured to open, close, or stay put.
ON LOSS OF POWER: Can be configured to close, or open.
NOTES: * Vout = Iout x Rx (use low TCR resistor for Rx)  Vout ≤8V so Rx≤400Ω
Manufacturer recommends Vout=5V, RX= 250Ω/ 0.25W)

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Manufacturer recommends Vout=5V, RX= 250Ω/ 0.25W)

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QUARTER TURN ELECTRIC ACTUATOR
STANDARD WIRING DIAGRAMS FOR SMART MODEL 20

Note: All AVA Smart Model 20 actuators are supplied pre-wired with a cable approximately 0.8m long

MODULATING 0-10V or 2-10V

WIRING DIAGRAM: U

AVA REFERENCE U
WIRING TYPE Permanent supply across Blue (BU) and Red (RD)
CONTROL SIGNAL I/O 0-10V
FAULT ALARM No, but available as an option. See wiring diagram ref: 5
ON LOSS OF SIGNAL Actuator closes
ON LOSS OF POWER Stays put.
NOTES * Use low TCR resistor for Rx

WIRING DIAGRAM: V

AVA REFERENCE V
WIRING TYPE Permanent supply across Blue (BU) and Red (RD)
CONTROL SIGNAL I/O 2-10V
FAULT ALARM No, but available as an option. See wiring diagram ref: 6
ON LOSS OF SIGNAL On loss of control signal, can be configured to open, close, or stay put.
ON LOSS OF POWER Stays put
NOTES * Use low TCR resistor for Rx

WIRING DIAGRAM: U & V Failsafe

AVA REFERENCE U & V Failsafe
WIRING TYPE Permanent supply across Blue (BU) and Red (RD)
CONTROL SIGNAL I/O Ref: 'U' = 0-10V
CONTROL SIGNAL I/O Ref: 'V' = 2-10V
FAULT ALARM No, but available as an option. See wiring diagram ref: 5 & 6 Failsafe
ON LOSS OF SIGNAL 'U' Closes
'V' Can be configured to open, close, or stay put.
ON LOSS OF POWER Can be configured to close, or open
NOTES * Use low TCR resistor for Rx

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SMART BUS COMMUNICATION

**WIRING DIAGRAM: W**

**AVA REFERENCE**  W [Modbus]

**WIRING TYPE**  Permanent supply across Blue (BU) and Red (RD)

**CONTROL**  RS485 Modbus

**ON LOSS OF POWER**  Stays put.

**NOTES**

Recommended wiring when using bus actuators in parallel.

**WIRING DIAGRAM: X**

**AVA REFERENCE**  X [Canbus]

**WIRING TYPE**  Permanent supply across Blue (BU) and Red (RD)

**CONTROL**  Canbus 2.0

**CONTROL SIGNAL I/O**  Ref: ‘V’ = 2-10V

**ON LOSS OF POWER**  Closed

**NOTES**
STANDARD WIRING DIAGRAMS FOR SMART MODEL 20

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WIRELESS COMMUNICATION

WIRING DIAGRAM: Y

AVA REFERENCE: Y
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL: RF Radio frequency RF433/868M/915M
ON LOSS OF POWER: Stays put.
NOTES: FSK / LORA Modbus compatible.

WIRING DIAGRAM: Y Failsafe

AVA REFERENCE: Y
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL: RF Radio frequency RF433/868M/915M
ON LOSS OF POWER: Fails closed but can be configured to fail open
NOTES: FSK / LORA Modbus compatible.

WIRING DIAGRAM: Y-OCEAN

AVA REFERENCE: Y-OCEAN
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL: RF-OCEAN [single control]
ON LOSS OF POWER: Stays put
NOTES: Several OCEAN switches could control one actuator, or several actuators could be controlled by one OCEAN switch

Recommended wiring when using wireless actuators in parallel.

Note: 110 & 240VAC can use ANSI plug

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TIMER

WIRING DIAGRAM: Z

AVA REFERENCE: Z
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL: Internal timer programmable by external push buttons
TIMER MODE: Pulse or time mode
LOOP MODE: Loop by days, or weeks
ON LOSS OF POWER: Stays put.

WIRING DIAGRAM: Z Failsafe

AVA REFERENCE: Z
WIRING TYPE: Permanent supply across Blue (BU) and Red (RD)
CONTROL: Internal timer programmable by external push buttons
TIMER MODE: Pulse or time mode
LOOP MODE: Loop by days, or weeks
ON LOSS OF POWER: Fails closed, or can be set to open

Note: 110 & 240VAC can use ANSI plug

ACCESSORIES:

ANTI-CONDENSATION HEATER

AVA REFERENCE: Heater
CONTROL TYPE: 2 wire permanent supply
NOTES: Unless otherwise stated UK stock is fitted with an anti-condensation heater as standard.