

AI815 Analog Input Module

Features

- 8 channels for 0...20 mA, 4...20 mA, 0...5 V or 1...5 V d.c., single ended unipolar inputs.
- 1 group of 8 channels isolated from ground.
- 12 Bit resolution.
- Current limited transmitter supply per channel.
- HART pass-through communication.

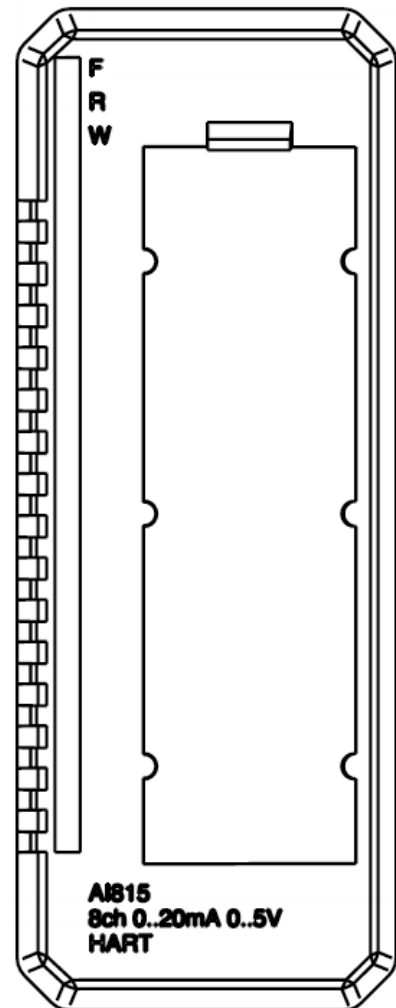
Description

The AI815 Analog Input Module has 8 channels. The modules can be configured for voltage or current inputs. Current and voltage signals cannot be mixed on the same I/O module.

The voltage and current input is able to withstand an overvoltage or undervoltage of at least 11 V d.c. The input resistance for voltage input is greater than 10 M ohm, and the input resistance for current input is 250 ohm.

The module distributes the external HART compatible transmitter supply to each channel. This adds a simple connection to distribute the supply to 2-wire or 3-wire transmitters. The transmitter power is supervised and current limited.

If an external power supply is used for feeding HART transmitters, the power supply must be HART compatible.



The module performs self-diagnostic cyclically. Module diagnostics include:

- External power supply, Transmitter power and External shunt error. Error in these are reported as External channel error.
- Analog Read Back, Reference Voltage, Internal Power Supply, Checksum, Watchdog and Memory. Error in these are reported as Module Error.

All the eight channels are isolated from the ModuleBus in one group. The power to the input stages is converted from the 24 V supply on the ModuleBus.

The module has HART pass-through functionality. Only point-to-point communication is supported.

Eight different types of MTUs can be used. The TU830/TU833 Extended MTU enables three wire connection to the devices without additional terminals. The TU810 (or TU814) Compact MTU has terminals for 24 V process voltage inputs, but requires external terminals for distribution of 24 V power supply to the field devices. The extended MTU, TU835, and TU838 provides a fuse (3 A max) per channel for the outgoing transmitter supply. TU818 Compact MTU provides connection to 2-wire transmitters without external marshaling. The TU812 Compact MTU has a D-Sub 25 pin (male) connector for connection to the process.

Shielded field cables for process connections are required, if HART is used.

The parameter Shunt mode should be set to Internal shunt when current input is required and set to External shunt when voltage input is required.

Technical Data*Table 14. AI815 Analog Input Module Specifications at 25° C*

Feature	AI815 Analog Input Module
Number of channels	8
Type of input	Unipolar single ended
Measurement range	0...20 mA, 0...5 V, 4... 20 mA, 1... 5V
Over range	+15%
Input impedance (at voltage input)	10 M Ω
Input impedance (at current input) (including PTC)	250 Ω
Maximum field cable length	600 meters, (656 yd.)
Voltage input, maximum non-destructive	11 V d.c.
NMRR, 50 Hz, 60 Hz	> 40 dB
Error	Max. 0.1%
Resolution	12 bit
Temperature drift	Max. 50 ppm/° C
Update cycle time	10 ms
Current consumption 24 V (Modulebus)	50 mA
Current consumption 5 V (Modulebus)	100 mA
Current consumption 24 V (process power supply, UPx)	339 mA (max) (22 mA + transmitter current * 1.32)

Table 14. AI815 Analog Input Module Specifications at 25° C (Continued)

Feature	AI815 Analog Input Module
Power dissipation	3.5 W
Transmitter supply:	HART compatible Voltage: 24 V @ 23 mA Current: 30 mA + - 10% ⁽¹⁾
Supervision	Module error, if: analog read back, reference voltage, internal power supply, checksum, watchdog and memory error External channel error, if: external power supply low, transmitter power error
Input filter (rise time 0-90%)	290 ms
Isolation	Groupwise isolated from ground
Module termination units	TU810, TU812, TU814, TU818, TU830, TU833, TU835 or TU838
MTU keying code	CC
Rated insulation voltage	50 V
Dielectric test voltage	500 V a.c.

(1) If the transmitter need more current to start up, use external power for the transmitter

Block Diagram AI815

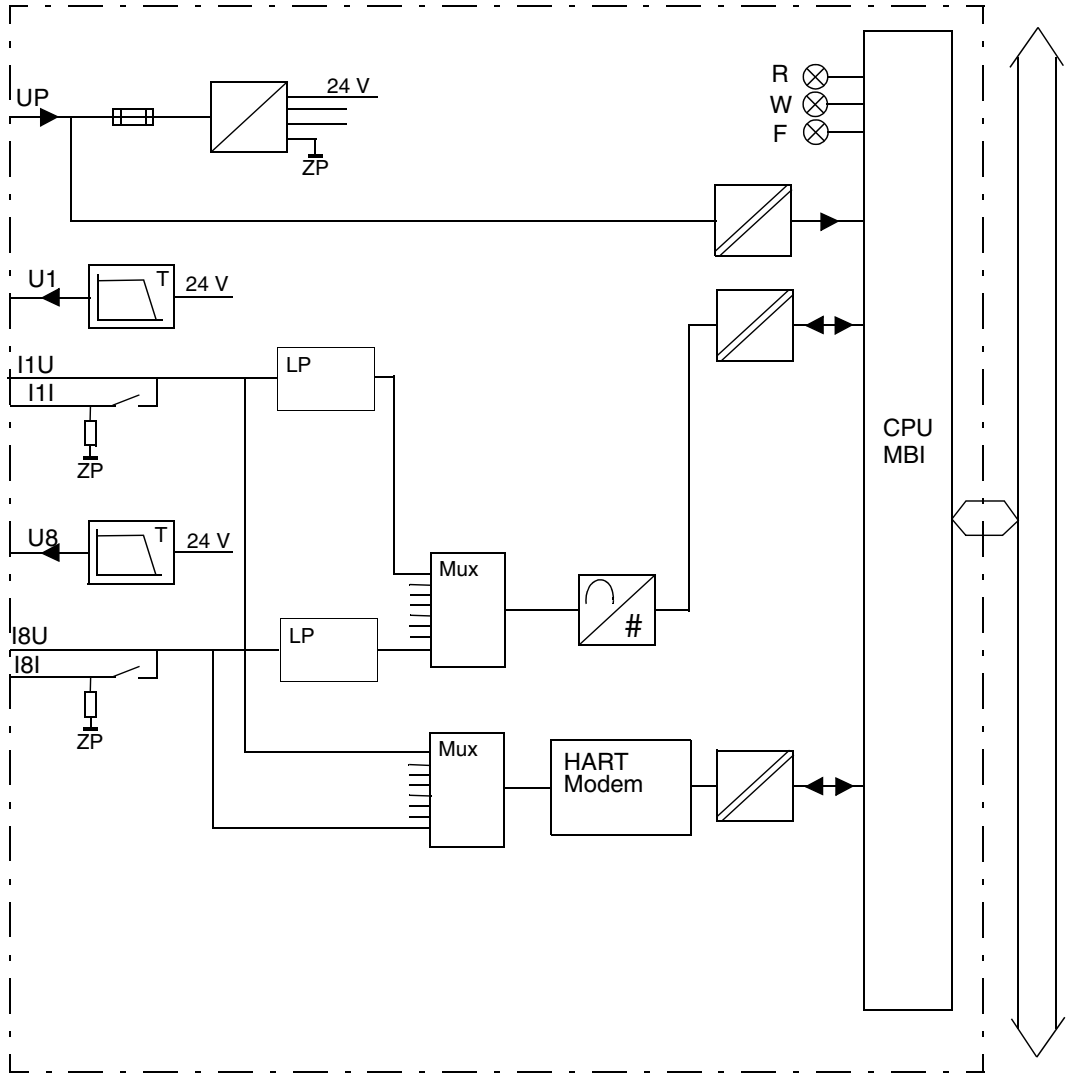


Figure 20. AI815 Block Diagram

Process Connections

With HART signals, shielded cables should be used for current process connections.

Table 15. AI815 Process Connections

Process Connection	TU810 (or TU814) Terminal	TU812 D-Sub 25 male Connector ⁽¹⁾	TU818 Terminal	TU830/ TU833 Terminal	TU835 Terminal	TU838 Terminal
+24 V d.c.	L1+ (2)	1, 14	L1+ (2)	L1+ (2)	L1+ (2)	L1+ (2)
0 V d.c. (ZP)	L1-	2, 15	L1- (2)	L1- (2)	L1- (2)	L1- (2)
U1	-	-	C1	B1	11 (F1)	A1 (F1)
Ch1, Voltage Input	C1	3	D1	C1	-	B1
Ch1, Current Input	B1	16	B1	C2	12	B2
Ch1, Return (ZP)	A1	-	-	A1, A2	-	A2
U2	-	-	C2	B3	21 (F2)	A3 (F2)
Ch 2, Voltage Input	C2	4	D2	C3	-	B3
Ch 2, Current Input	B2	17	B2	C4	22	B4
Ch 2, Return (ZP)	A2	-	-	A3, A4	-	A4
U3	-	-	C3	B5	31 (F3)	A5 (F3)
Ch 3, Voltage Input	C3	5	D3	C5	-	B5
Ch 3, Current Input	B3	18	B3	C6	32	B6
Ch 3, Return (ZP)	A3	-	-	A5, A6	-	A6
U4	-	-	C4	B7	41 (F4)	A7 (F4)
Ch 4, Voltage Input	C4	6	D4	C7	-	B7
Ch 4, Current Input	B4	19	B4	C8	42	B8
Ch 4, Return (ZP)	A4	-	-	A7, A8	-	A8
U5	-	-	C5	B9	51 (F5)	A9 (F5)

Table 15. AI815 Process Connections (Continued)

Process Connection	TU810 (or TU814) Terminal	TU812 D-Sub 25 male Connector (1)	TU818 Terminal	TU830/ TU833 Terminal	TU835 Terminal	TU838 Terminal
Ch 5, Voltage Input	C5	7	D5	C9	-	B9
Ch 5, Current Input	B5	20	B5	C10	52	B10
Ch 5, Return (ZP)	A5	-	-	A9, A10	-	A10
U6	-	-	C6	B11	61 (F6)	A11 (F6)
Ch 6, Voltage Input	C6	8	D6	C11	-	B11
Ch 6, Current Input	B6	21	B6	C12	62	B12
Ch 6, Return (ZP)	A6	-	-	A11, A12	-	A12
U7	-	-	C7	B13	71 (F7)	A13 (F7)
Ch 7, Voltage Input	C7	9	D7	C13	-	B13
Ch 7, Current Input	B7	22	B7	C14	72	B14
Ch 7, Return (ZP)	A7	-		A13, A14	-	A14
U8	-	-	C8	B15	81 (F8)	A15 (F8)
Ch 8, Voltage Input	C8	10	D8	C15	-	B15
Ch 8, Current Input	B8	23	B8	C16	82	B16
Ch 8, Return (ZP)	A8	-	-	A15, A16	-	A16
+24 V d.c.	L2+ (2)	11, 24	L2+ (2)	L2+ (2)	L2+ (2)	L2+ (2)
0 V d.c. (ZP)	L2-	12, 25	L2- (2)	L2- (2)	L2- (2)	L2- (2)

(1) Pin 13 connected to connector body for EM.

Figure 21 shows the process connections for the Analog Input Module AI815 when installed on a TU830/TU833 Extended MTU.

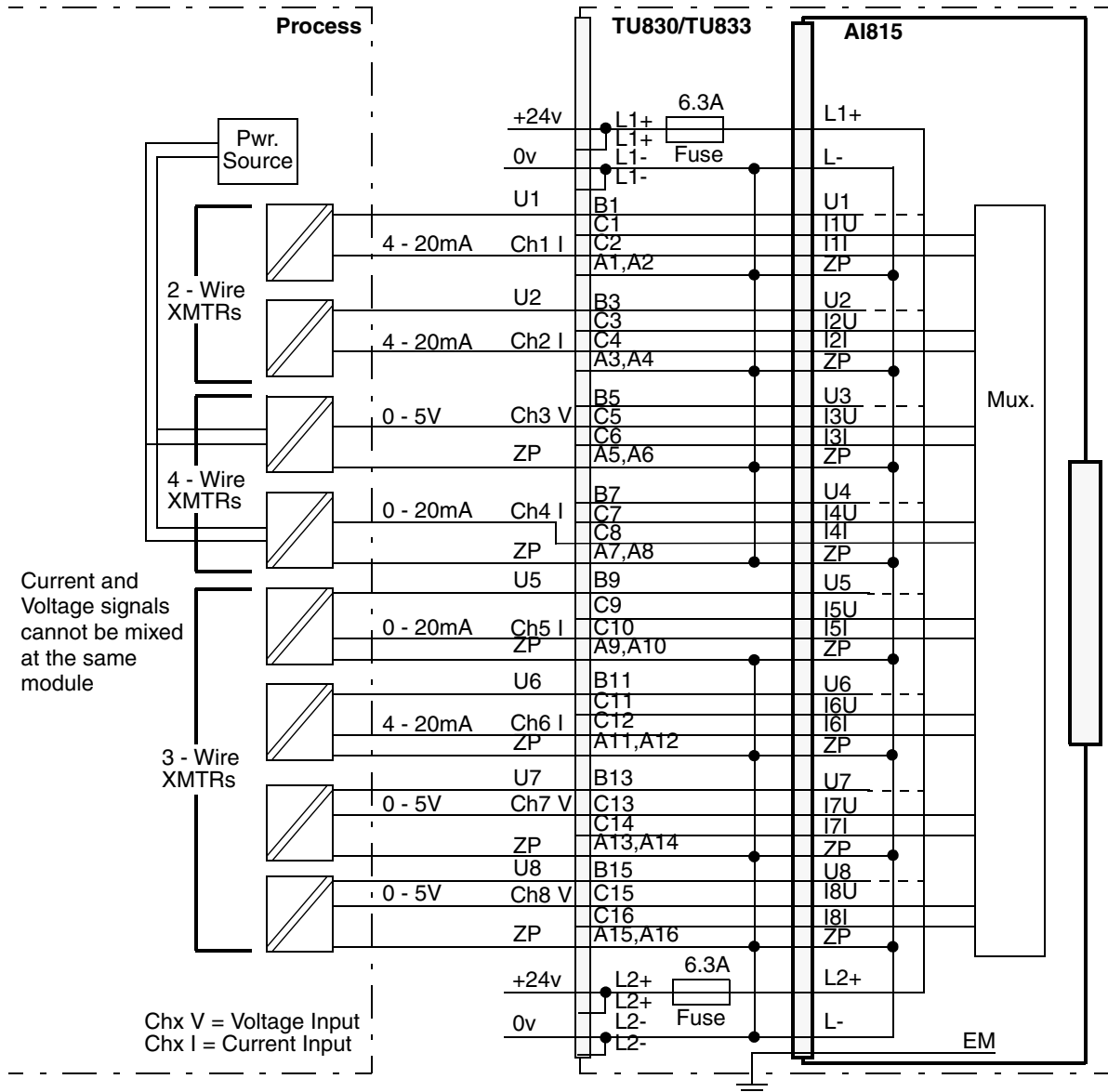


Figure 21. AI815 with TU830/TU833 Extended MTU Process Connections

Figure 22 shows the process connections for the Analog Input Module AI815 when installed on a TU835 Extended MTU.

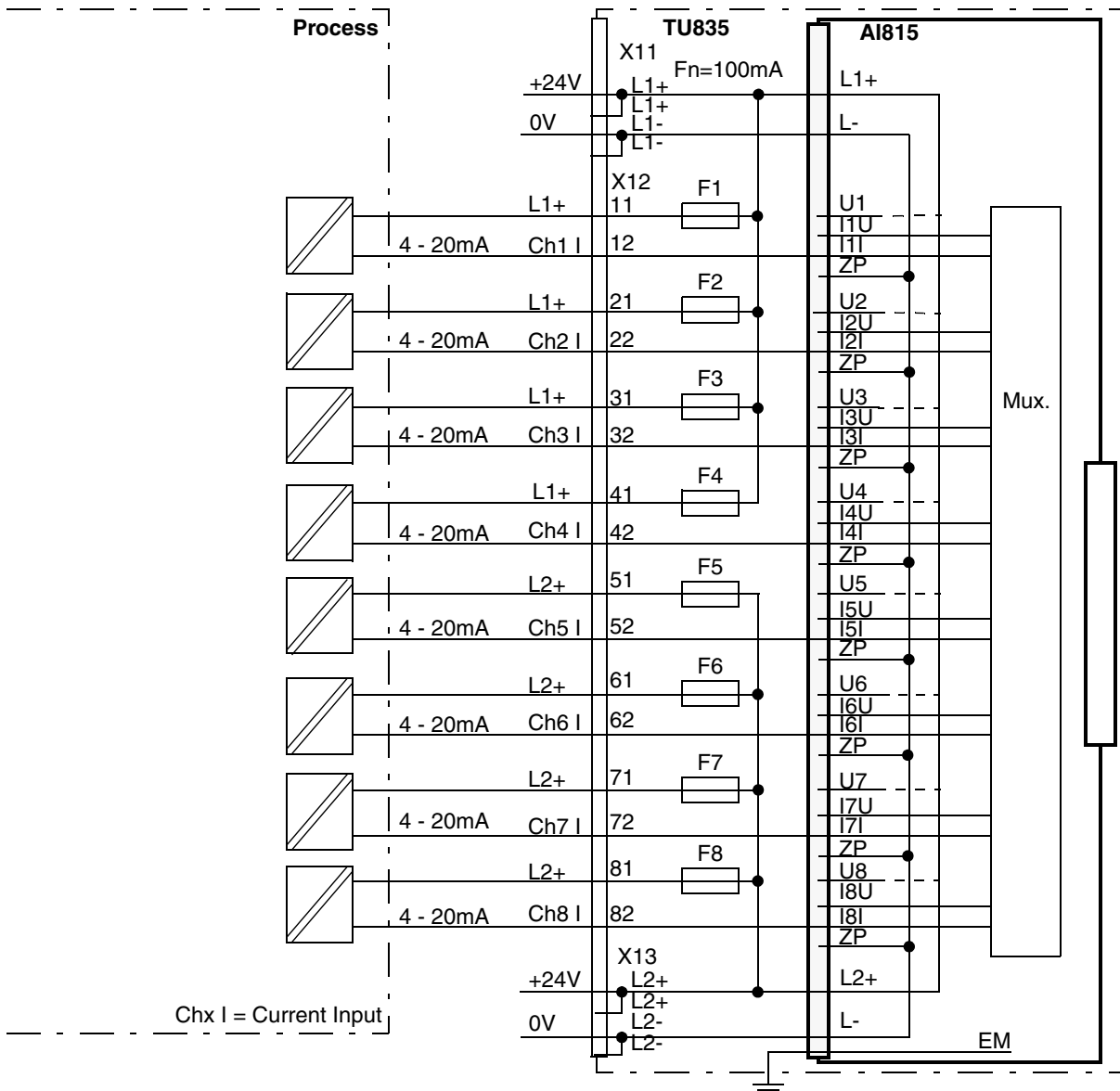


Figure 22. AI815 with TU835 Extended MTU Process Connections

Figure 23 shows the process connections for the Analog Input Module AI815 when installed on a TU838 Extended MTU.

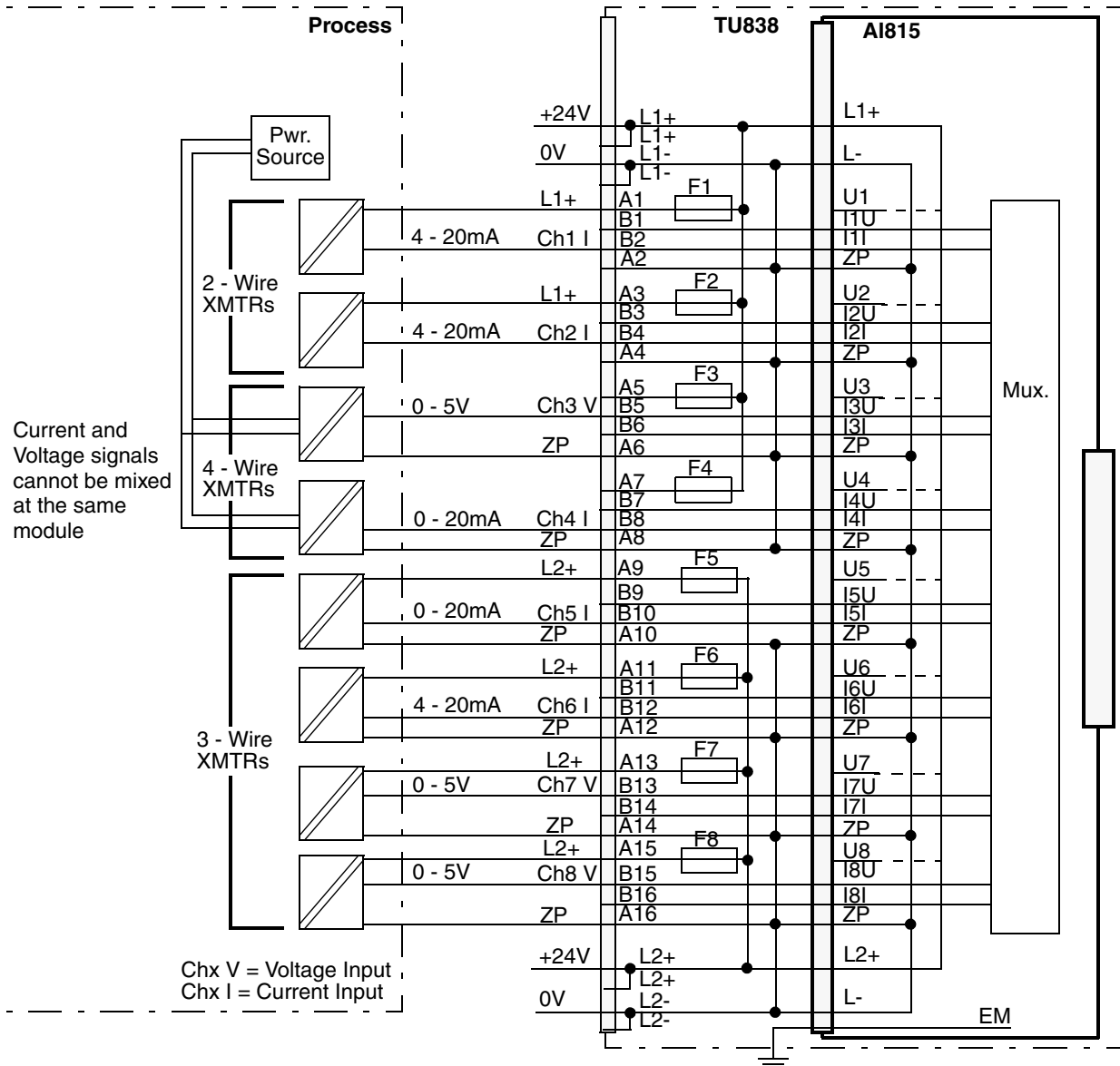


Figure 23. AI815 with TU838 Extended MTU Process Connections

Figure 24 shows the process connections for the Analog Input Module AI815 when installed on a TU810 or TU814 Compact MTU.

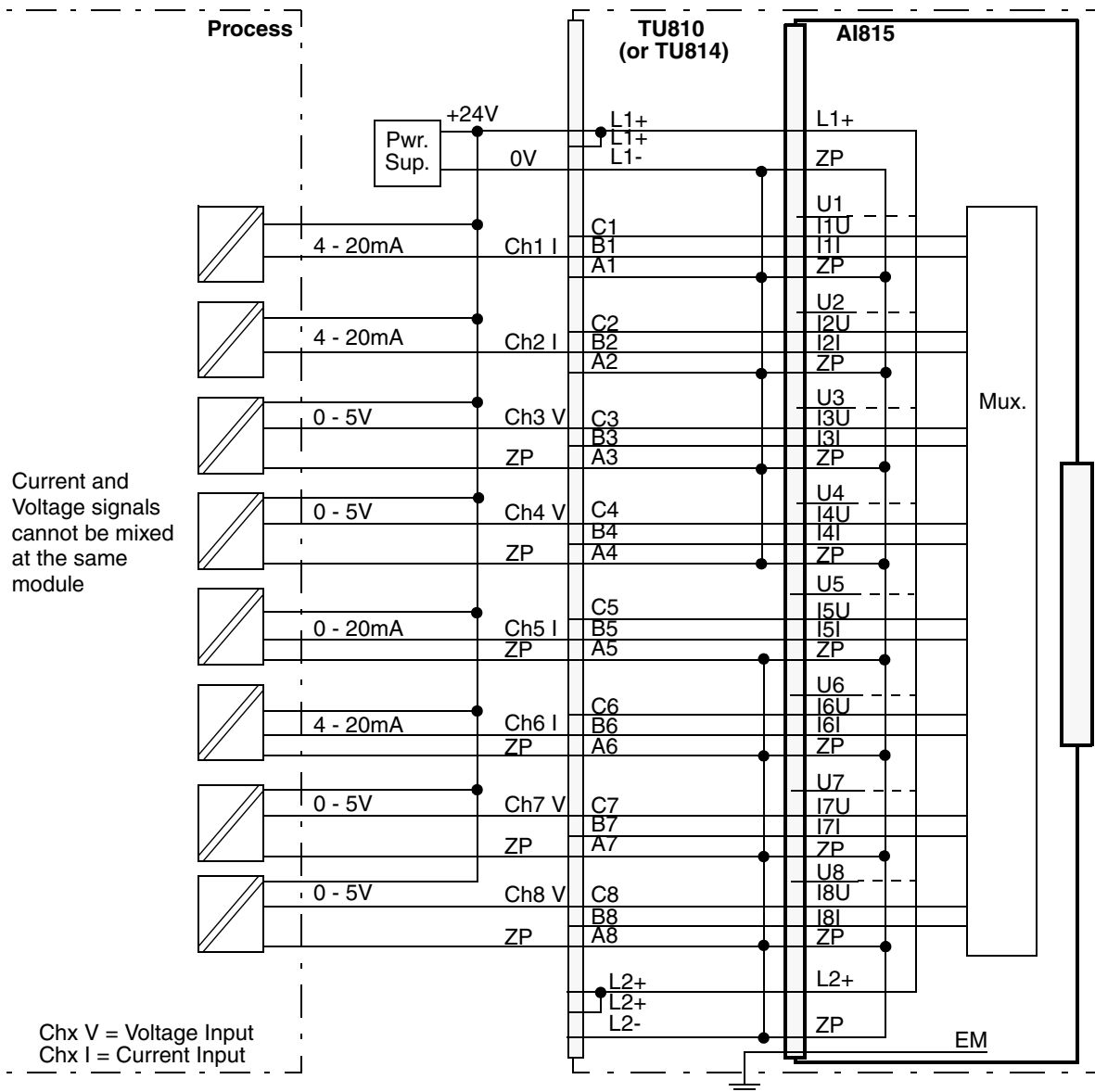


Figure 24. AI815 with TU810 or TU814 Compact MTU Process Connections

Figure 25 shows the process connections for the Analog Input Module AI815 when installed on a TU812 Compact MTU.

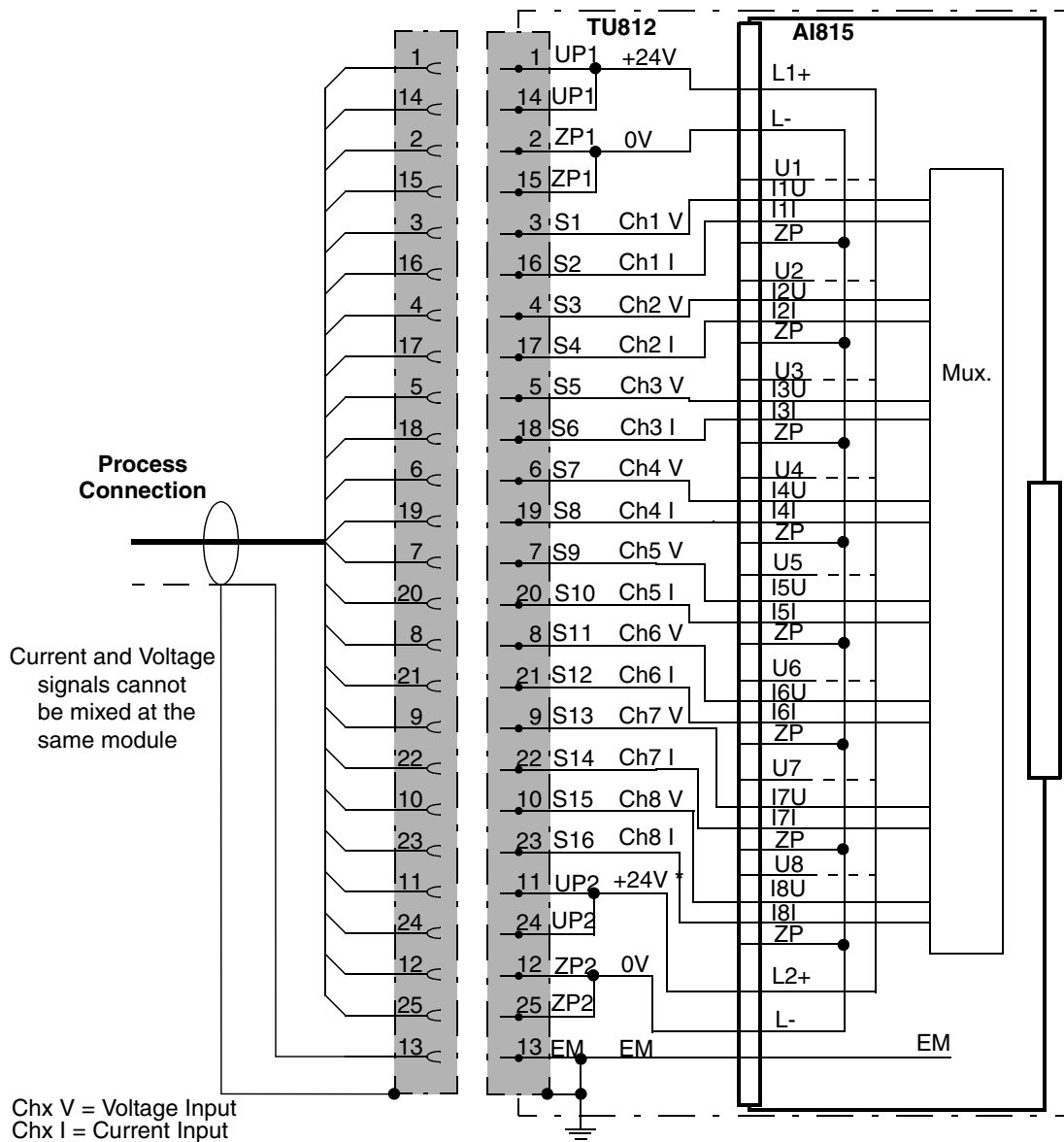


Figure 25. AI815 with TU812 Compact MTU Process Connections