2.09

3.53

SERIAL NUMBER

24V G NC A+ B- NC RX TX
VAC/DC   RS-485   LED

AI-BOX
8CH Analog Input Module

1 2 3 4 5 6 7 8 GND
+ + + + + + + + -

GENERAL:

The AI-Box Model is 12-bit analog input modules designed for use with the Q-Controller control system. The modules provide a means of high-density signal measurement for data-acquisition applications. The AI-Box module accepts 8 channels 4-20 mA process signals.

The AI-Box and other IO-Box modules connect and communicate via a RS-485 2-wire connection to the Q-Controller. The Q-Controller supports any combination of the IO Box, the AI-Box can be up to 16 modules, allowing a total of 128 4-20mA analog signals to be monitored via a single Q-Controller.

All AI-Box configuration information is strored in Q-Controller and the 4-20mA calibration data is stored locally within the module, so replacement modules do not need to be configured and calibrated.

The AI-Box' high density packaging, removable terminal block and DIN rail mounting saves time and panel space. The module snaps easily onto standard top hat (T) profile DIN rail.
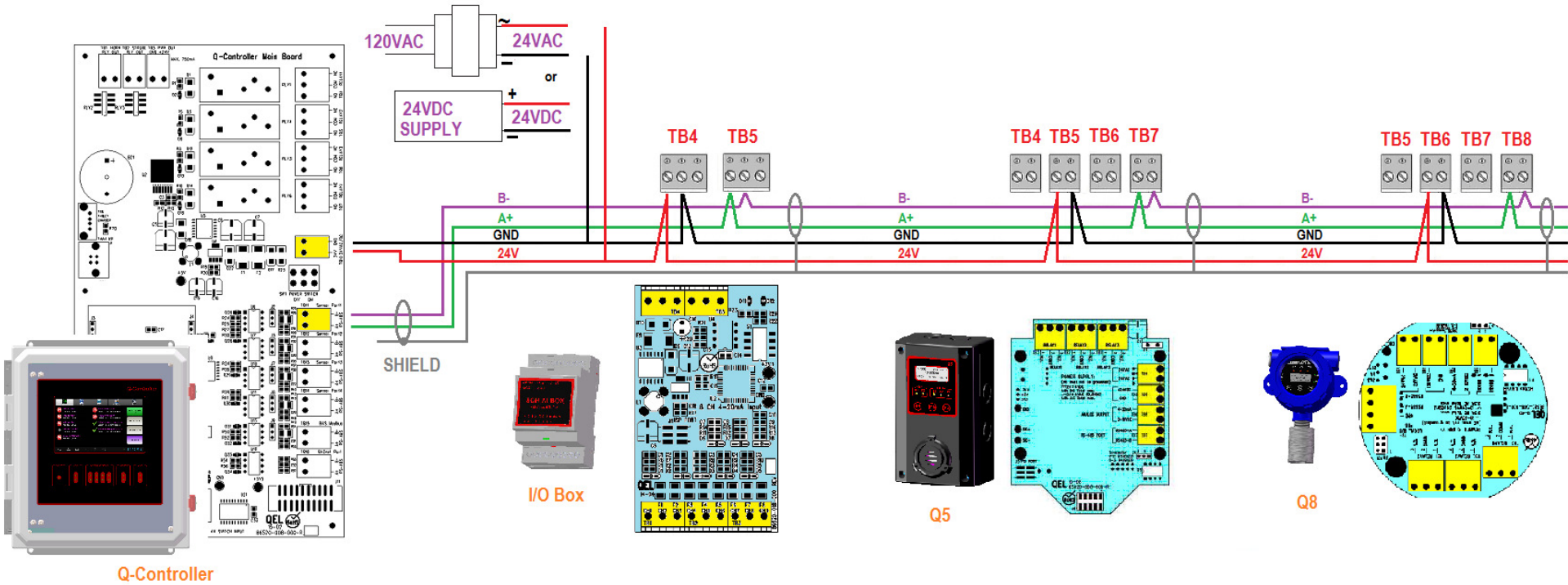
Specification:

Fuse	F9 : Polyswitch 750mA Polyswitch device resets after the fault is cleared and power to the circuit is removed
Power Supply	Voltage: 24VDC nominal, range 18 to 30VDC 24VAC nominal, range 15 to 24VAC 50/60HZ Note: Input Power is half-wave rectifier circuit, it can be either floating or grounded. You will damage devices if you mix half wave and full wave rectifiers on the same AC source. Use extreme caution when sharing a common AC source. Sharing a common DC source is less problematic. The AI-Box can share the same AC or DC power supply with Q-Controller, as Q-Controller is half-wave rectifier inside. Current: max. 0.75 A (fuse protected) Actual running current < 0.1A
Address	Address can be defined from 0 to 15 with the four dipswitch A0, A1, A2 and A3 See left table for address setup Factory Default address is 0 with A0=OFF, A1=OFF, A2=OFF, A3=OFF
Panel Indicators	TX/RX status RS-485 port TX/RX Status for Q-Controller Network

24VAC/DC   RS-485
+   -   A+   B-

DIPSwitch Setting for Address:
-- A3
-- A2
-- A1
-- A0

8 CH 4-20mA Input

J1 ISP PORT

QEL
14-04

CH1 F1 F2 CH2 F3 CH4 F5 CH6 CH7 F8 GND
CH3   F4   F6 F7
TB1   TB2   TB3

86550-003-000 REV

CH1 CH2 CH3 CH4 CH5 CH6 CH7 CH8 GND   8x Analog Input

Module Address	Dip Switch Setting			
	A0	A1	A2	A3
0	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF
2	OFF	ON	OFF	OFF
3	ON	ON	OFF	OFF
4	OFF	OFF	ON	OFF
5	ON	OFF	ON	OFF
6	OFF	ON	ON	OFF
7	ON	ON	ON	OFF
8	OFF	OFF	OFF	ON
9	ON	OFF	OFF	ON
10	OFF	ON	OFF	ON
11	ON	ON	OFF	ON
12	OFF	OFF	ON	ON
13	ON	OFF	ON	ON
14	OFF	ON	ON	ON
15	ON	ON	ON	ON

UNLESS OTHERWISE SPECIFIED:		NAME	DATE	QUATROSENSE ENVIRONMENTAL LTD.		
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL± ANGULAR: MACH± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN	XY	15-05-06	TITLE: AI-BOX Installation Drawing		
	CHECKED					
	ENG APPR.					
	MFG APPR.					
	Q.A.					
INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:					
MATERIAL				SIZE **B**	DWG. NO. 86550-003-000	REV **A**
FINISH						
NEXT ASSY	USED ON					
APPLICATION	DO NOT SCALE DRAWING			SCALE: 1:2	WEIGHT:	SHEET 1 OF 3

Recommend Connection for New Installations

120VAC ~ **24VAC**

or

24VDC SUPPLY + **24VDC**

Q-Controller Main Board

TB4 TB5 — TB4 TB5 TB6 TB7 — TB5 TB6 TB7 TB8

B-
A+
GND
24V

B-
A+
GND
24V

B-
A+
GND
24V

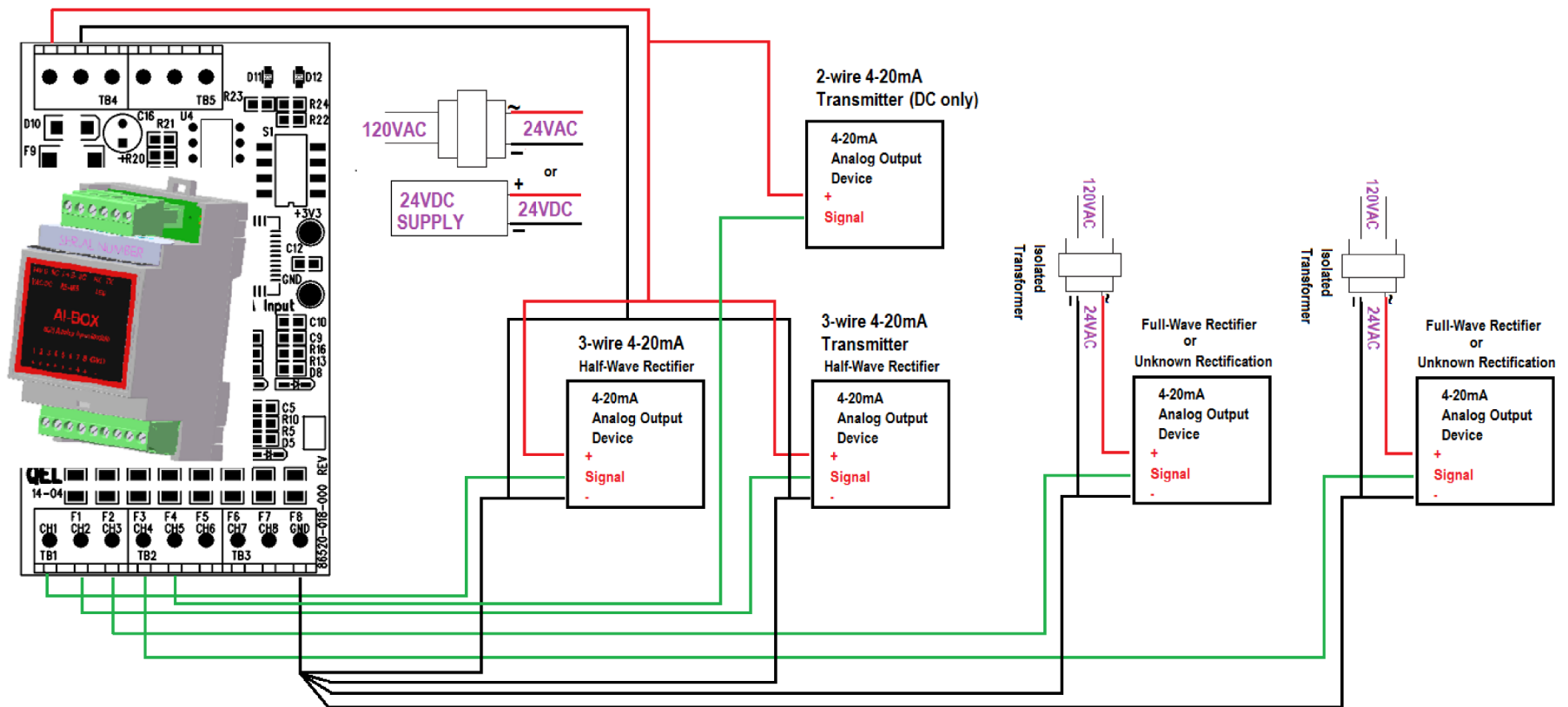SHIELD

Q-Controller

I/O Box

Q5

Q8

Note:
1. The power supply can be 24VAC or DC as every device uses a half-wave rectifier in the drawing
2. The power negative may be grounded or floating
3. Don't mix full wave rectifiers device with this system
4. RS-485 cable should wired from one sensor to another without tees or stub. Power cable does not matter
5. Before power up, the polarity of the 24VAC power supply should be checked carefully, reversing polarity on the network will cause the RS-485 driver chips blow up
6. The I/O Box in the drawing can be AI-Box, AO-Box, BI-Box or BO-Box

				NAME	DATE	QUATROSENSE ENVIRONMENTAL LTD
		UNLESS OTHERWISE SPECIFIED:				
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL± ANGULAR: MACH± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN			
			CHECKED			TITLE:
			ENG APPR.			AI-Box
			MFG APPR.			Installation Drawing
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				SIZE **B**	DWG. NO. 86550-003-000	REV **A**
APPLICATION		DO NOT SCALE DRAWING				SCALE: 1:4 1	SHEET 2 OF 3

AI-BOX Connection

2-wire 4-20mA Transmitter (DC only)

4-20mA Analog Output Device
+ Signal

120VAC — 24VAC

24VDC SUPPLY — or — 24VDC

3-wire 4-20mA Half-Wave Rectifier

4-20mA Analog Output Device
+ Signal -

3-wire 4-20mA Transmitter Half-Wave Rectifier

4-20mA Analog Output Device
+ Signal -

Isolated Transformer — 120VAC — 24VAC

Full-Wave Rectifier or Unknown Rectification

4-20mA Analog Output Device
+ Signal -

Isolated Transformer — 120VAC — 24VAC

Full-Wave Rectifier or Unknown Rectification

4-20mA Analog Output Device
+ Signal -

NOTE for AI-Box:

- The AI-Box is non-isolated devices with a half-wave rectifier on the 24VAC/DC power input terminal. Therefore, to prevent equipment damage, multiple devices that are powered by a common 24VAC transformer must use common device power connections (e.g.24VAC input power to other device power inputs, and ground to other device grounds), or dedicated isolated transformers must be provided for each non-isolated device.
- The AI-Box 24VAC/DC input power ground and analog input signal returns are common.
- If it is known that the connected analog device is half-wave rectified, it can share the same AC power supply with the AI-Box
- If the rectification of the other device is unknown, it is recommended that a separate transformer is used to power other device.

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	Quatrosense Environmental Ltd
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL± ANGULAR: MACH± BEND ± TWO PLACE DECIMAL ± THREE PLACE DECIMAL ±	DRAWN			TITLE: AI-Box Installation Drawing
			CHECKED			
			ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			SIZE **B** / DWG. NO. 86550-003-000 / REV **A**
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				SCALE: 1:2 / WEIGHT: / SHEET 3 OF 3