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Instruction & Operation Manual

RS-485 / RS-232 Digital Actuator Control Board

PN: 9643-47 ASSY. Rev-A-B

Revision-1.3

Aug 2014

Form: F-4201

- Revision History -

Rev 1.0 - Dec. 1997

Covers actuator control board revisions A & B. Originally used a Bussman 1/2 Amp fast acting fuse.

Rev 1.1 - Aug. 1998

Modified fuse specification to Bussman MDL-1/2 (1/2 Amp time delay). Updated telephone area code from 714 to 949.

Rev 1.2 - May 2013

Keiser Mfg. acquired the RSV product line.

Rev 1.3 - May 2014

Update form number F-4057 to F-4201. (This design will be phased out and replaced by F-4202)

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1.0 PRODUCT SPECIFICATIONS

The 9643-47 card is a hardware product designed to control the RSV-series valve actuators either on a point-to-point basis using RS-232 interface or as a networked multi-drop configuration using RS-485 interface.

1.1 General Specifications

Power	115 VAC single phase (1/20 Hp)
Maximum current	0.5 AMP (Time delay fuse: use Bussman MDL-1/2)
Motor rotation	CW, CCW
Motor speed	16.7 RPM
Mechanism speed	8 RPM (approx.)

1.2 Network Interface (RS-485)

- Allows host computer or PLC to set valve positions using Modbus™ 4xxxx holding registers.
- Up to 32 actuator addresses with adjustable on-board rotary switches.
- Slave address configurable: 1 to 247
- Communication to actuator network: RS-485 (2-wire).
- Modbus™ Interface Controller: RS-232/422/485 pre-configured to:
 - Baud Rate: 9600
 - Mode: RTU
 - Data Bits: 8
 - Stop Bits: 1
 - Parity: None

1.3 Point-To-Point Interface (RS-232)

- RS-232 Electrical Interface
- Allows host computer or PLC to set valve positions
- Griswold pre-configured to:
 - Baud Rate: 1200
 - Mode: ASCII
 - Data Bits: 8
 - Stop Bits: 1
 - Parity: None

1.4 Safety Features

- Failsafe function sends valves home in case of any communication problems.
- ½ AMP fuse prevents motor damage and overheating in case nozzle becomes locked.

2.0 CONNECTIONS / HARDWARE SETUP

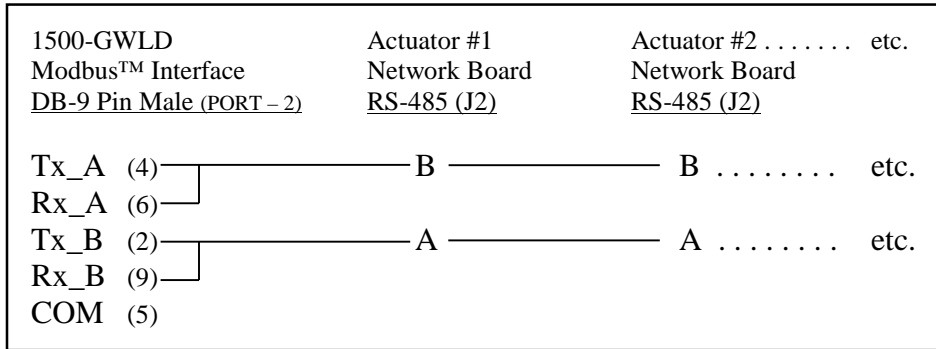
2.1 MAIN POWER:

Connect main power to terminal block. (See Fig.3) H-HOT, N-NEU, G-GND are stamped next to the terminal block.

2.2 RS-485 CONNECTION: (Network)

Field wiring & cables supplied by customer.

Two conductors (18-24 AWG) are required to daisychain the actuators. Connect label 'A' of terminal J2 to the 'A' of each actuator on the network. Perform the same connection procedure for label 'B' of terminal J2. (See Fig.2)



Termination Block:

Jumper JP1 is removed (factory setting) for communicating at up to 9600 baud. (See Fig.2)

2.2.1 SETTING NETWORK ADDRESSES:

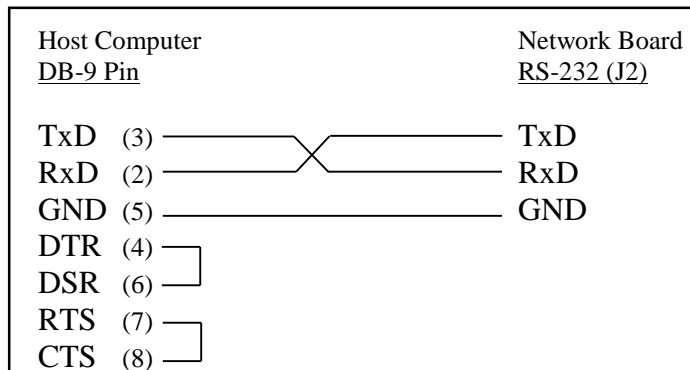
Each network control board is equipped with two rotary switches. (See Fig.2 RSW1 & RSW2) RSW1 is marked with X10, the tens digit of the address and RSW2 is marked with X1, the ones digit. Each switch provides 0-9 selection. Valid address range is 01 to 32. For the network to operate properly, all addresses must be unique otherwise, a communication error will occur.

Example: address '01' is RSW1 = 0 & RSW2 = 1.

2.3 RS-232 CONNECTION: (Point-to-Point)

Field wiring & cables supplied by customer.

Three conductors are required to control actuators on a point-to-point basis. TxD, RxD and GND are used for this connection.



2.3.1 RS-232 PROTOCOL SETTINGS:

Baud Rate: 1200
Mode: ASCII
Data Bits: 8
Stop Bits: 1
Parity: None

2.3.2 COMMAND INSTRUCTIONS:

Sending standard ASCII characters to the electronic board, allows complete control of each actuator. Below is a table that outlines valid requests from a host computer or PLC, and the expected response from the actuator. Items in (parenthesis) are ASCII code equivalents. Items in [brackets] are Hex value equivalents.

HOST	ACTION	RESPONSE
? (63) [3F]	Get Current Valve Position	Sends Current Valve Position
0 (48) [30]	Send Valve to Position '0' - Home	Valve Rotates to Position & Stops
1 (49) [31]	Send Valve to Position '1'	Valve Rotates to Position & Stops
2 (50) [32]	Send Valve to Position '2'	Valve Rotates to Position & Stops
3 (51) [33]	Send Valve to Position '3'	Valve Rotates to Position & Stops
4 (52) [34]	Send Valve to Position '4'	Valve Rotates to Position & Stops
5 (53) [35]	Send Valve to Position '5'	Valve Rotates to Position & Stops
6 (54) [36]	Send Valve to Position '6'	Valve Rotates to Position & Stops
7 (55) [37]	Send Valve to Position '7'	Valve Rotates to Position & Stops
N (78) [4E]	Send Valve to Position 'N' - *Null	Valve Rotates to Position & Stops

*Null is a function that tells the actuator to align the nozzle between two ports. This allows up to eight wells to be in operation, using the maximum available ports.

3.0 FAILSAFE FUNCTIONALITY

This feature provides a safety means for sending a valve home in one of the following conditions.

Automatic:

In the event, the Modbus™ Interface Controller fails to communicate for one minute or the RS-485 cable is disconnected by accident, the RSV actuator will drive itself to the home position and wait for a position or status request.

Remote:

Failsafe mode can be controlled from the main control panel if a switched/fused 24 V AC/DC signal is supplied to the actuator control board. (See Fig.2) This allows control without having to remove the actuator lid. In this mode, it is necessary to remove jumper JP2 on the actuator control board and place slider switch SW1 to RUN for normal operation. To force the valve home, slide switch SW1 to HOME or open switch/fuse at control panel.

Manual:

When sending a valve home for maintenance or repair, the operator can remove jumper JP2 and cause the valve to rotate to home position. Replacing the jumper puts the valve into normal network operating mode. An alternate method is to disconnect power from the actuator and use the manual input shaft to rotate the actuator home.

WARNING!

In known hazardous locations, it is dangerous to operate the actuator with the lid removed and a live circuit exposed to the environment. To avoid the risk of electrical shock or an explosion, disconnect all power before performing service on the actuator or valve.

4.0 DIAGNOSTICS

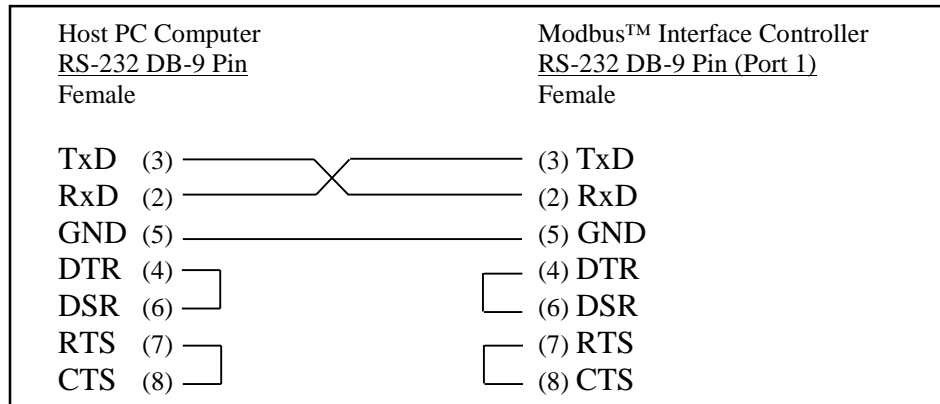
A diagnostics software program is included with your purchase of each Modbus™ interface controller card, which allows the user to monitor the network communication activity and control any valve on the network. This is a useful tool to isolate the PLC equipment from the network and verify that each valve is operating properly. This is royalty free software, you are free to make as many copies as you wish.

As a rule of thumb, we recommend using the software on startup installations to verify that the network is fully functional without any interaction from the PLC. After the network is operating properly, establish the connections between the PLC, Modbus™ Interface Controller and network. Start the PLC program. If troubles continue, refer to the electrical startup checklist and verify that all cables are properly constructed, connected, power is applied and fuses are functional.

4.1 HARDWARE REQUIREMENTS:

- 486 or better PC (Notebook Computer - with trackball)
- Available Comm Port 1 or 2
- Windows
- SVGA 640 x 480 min. resolution
- 5-10 Mb-hard disk space
- RS-232 Cable (*supplied by customer*)

RS-232 Cable Specifications



Connect RS-232 cable from PC computer's COM port to port 1 of the Modbus™ Interface Controller card.

4.2 PC Software:

Install the MODBUS software following the instructions printed on the disk label. Open the README.TXT file, located in the MODBUS subdirectory and print a hardcopy for installation and operation instructions.

5.0 SUPPORT, SERVICE AND WARRANTY

5.1 **TECHNICAL SUPPORT:**

At Keiser Mfg., our goal is to provide meaningful support to our customers. Should any questions or problems arise, please contact us:

Keiser Mfg., Inc.
3501 North Hwy. 123 Bypass Rd.
Seguin, TX 78155
(830) 379-0721
(830) 379-4609 fax

support@keiser-mfg.com

This document, along with others pertaining to our products is located on our web site.

www.keiser-mfg.com

In order for us to respond as quickly and accurately as possible, we will need some information about the actuator and electronics. Provided for your convenience is a pre-formatted technical-services-request form, which is located in appendix A. Fill out as much of the form as possible and fax it to us before calling for technical support.

5.2 **SERVICE AND REPAIR:**

The 9643-47 actuator control boards are electronic products designed and manufactured to function in adverse operating conditions. As with any product, many factors can change the expected life of the electronic board. In the event, that repair or replacement is required please direct returns to the above address, ATTN: Oil Valve Return / Repairs Dept. Returns must include a copy of the technical-services-request form with information on each returned item.

5.3 **WARRANTY:**

Keiser Mfg., Inc. (Hereinafter referred to as KMI) guarantees electronics for 90 days from the date of shipment against electronic defects in material or workmanship, which develop in the service for which they are designed. KMI will replace defective material without charge when returned to our factory with transportation charges prepaid. This is provided material is found defective after inspection. KMI assumes no liability for labor or other expenses in making adjustments or repairs. KMI will not be liable for consequential, special or indirect damages of any kind caused by defective products, parts, delay or default on delivery or otherwise. KMI assumes no liability for damages or attorney fees which exceeds the purchase price. All replacements will be F.O.B. from the KMI factory.

Typical Actuator Network Layout

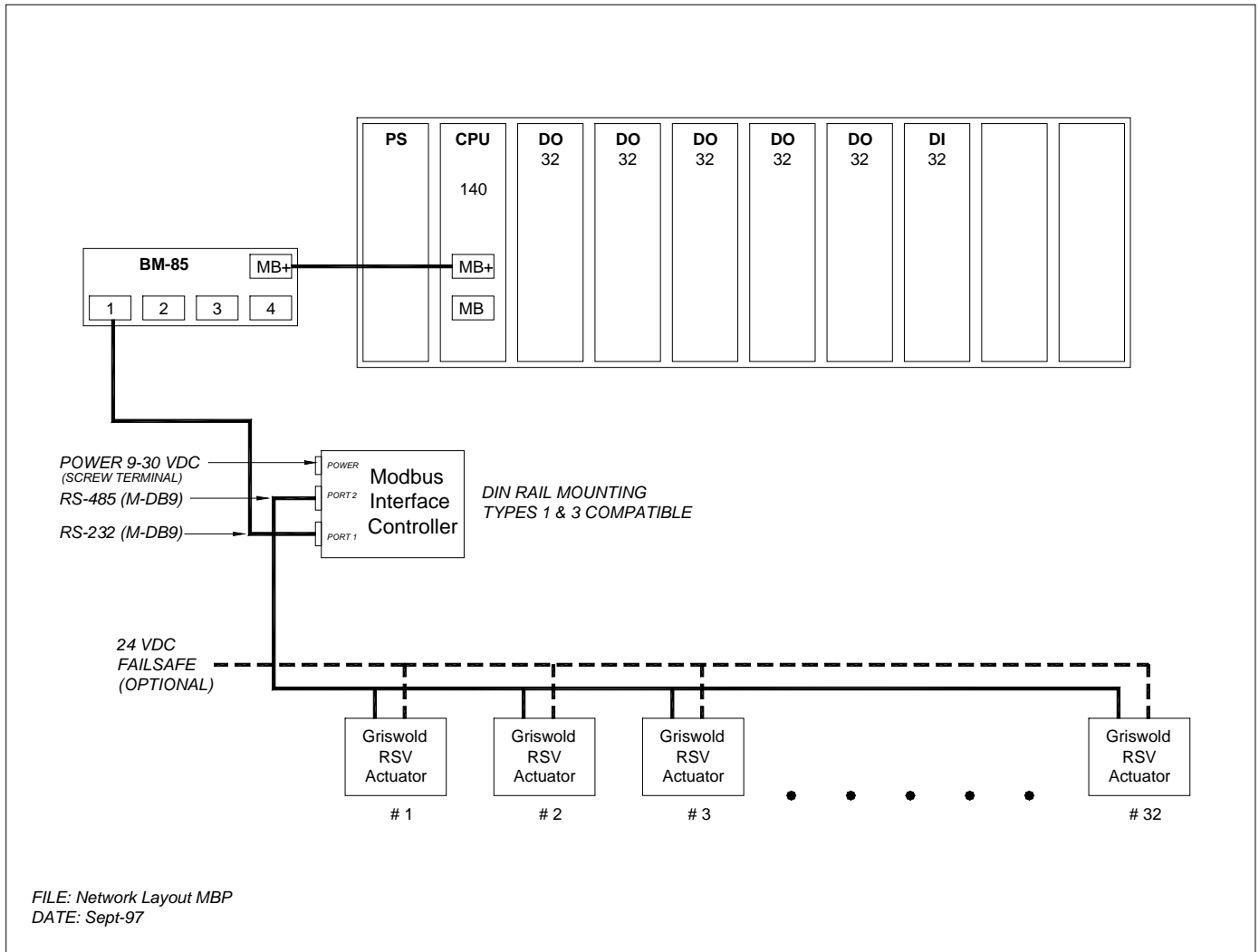


Fig.1

Actuator Control Board

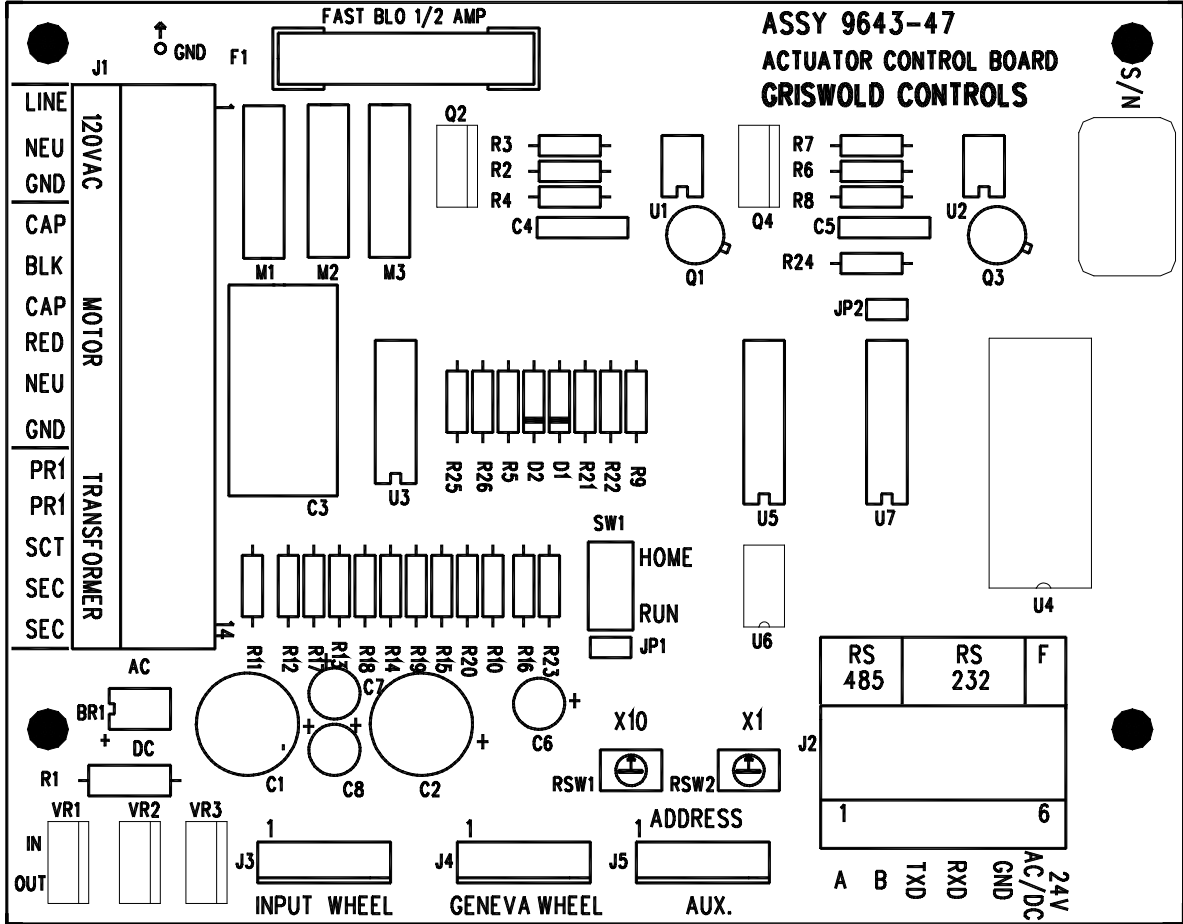


Fig. 2

Electrical Wiring Diagram

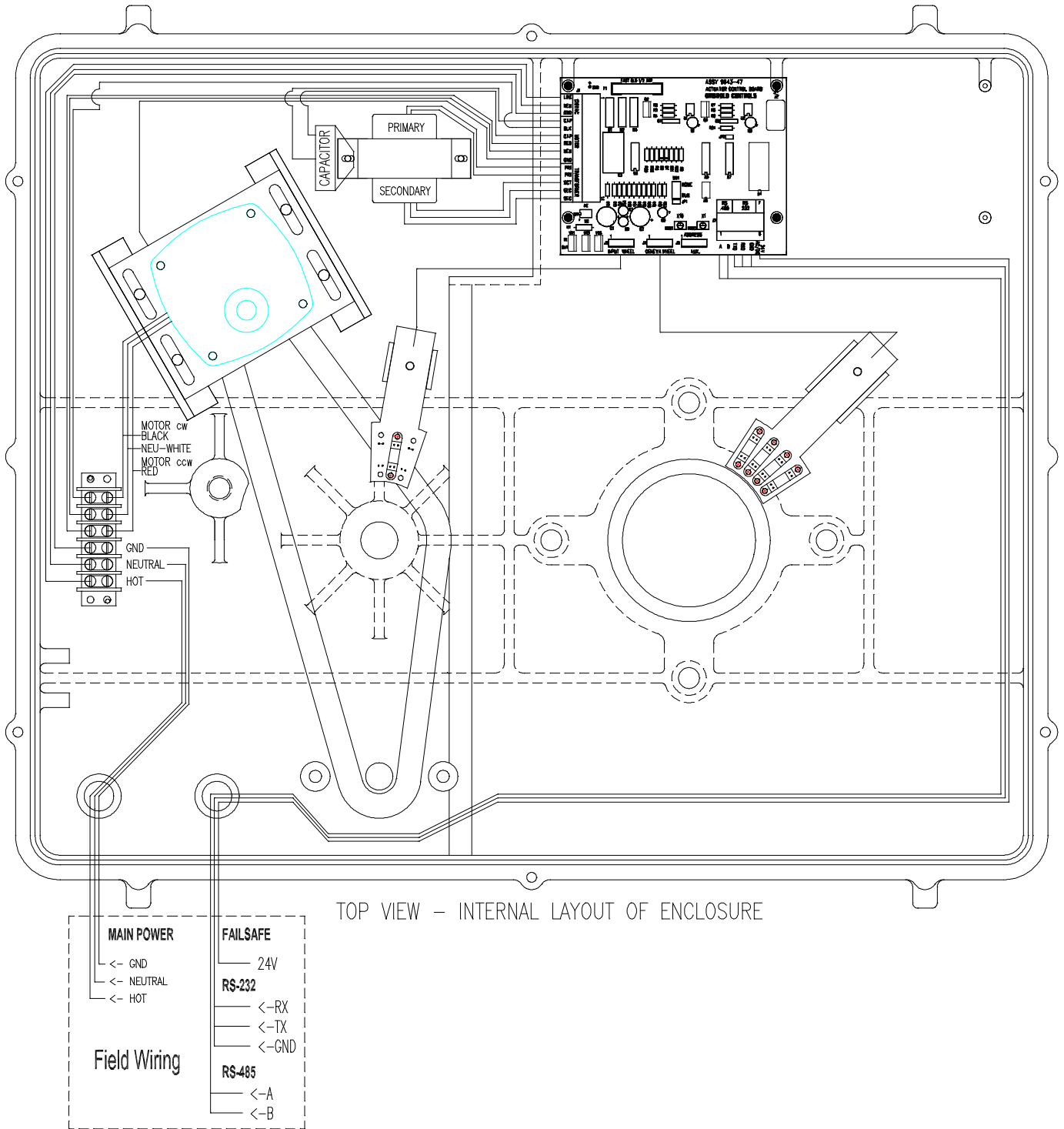


Fig. 3

Appendix A

Keiser Mfg., Inc.
Oil Valve Actuator
Technical Services Request Form
Fax to 830-379-4609
Or send email to: support@keiser-mfg.com

Company Name _____ Date _____
Your Name _____
Phone # _____
Fax # _____

Actuator Serial Number (If available) _____

Electronic Control Board Assembly # _____
(Located on top surface of board: **ex. ASSY 9643-47**)

Electronic Serial Number _____

Mechanical Seal Type _____

Nature of problem: Electrical Mechanical

Brief Description:

Appendix B

Electrical Startup Checklist

Actuators:

- Connect main power to actuator. (120VAC, 60Hz, single phase)
- Connect serial cable (RS-232 or RS-485) to each actuator.
- Set address switches (RS-485 mode only) for unique actuator identification.
- Check board jumper settings for desired operation.
- Connect Failsafe wire. (Optional)

Modbus™ Interface Controller: (See Fig.1)

- Verify proper jumper settings.
- Connect RS-485 cable from port 2 to actuators.
- Connect RS-232 cable from port 1 to PLC.
- Connect DC power supply to board. (9-30 Vdc)