Tritek Micro Controls Pvt. Ltd.
4051, Bhandup Indl. Estate,
Pannalal Compound, L.B.S Marg,
Bhandup (W), Mumbai-400078. INDIA
Tel- +91-22- 25968568, 25965737, 25968384.
Fax- +91-22-25962847
Email: tritek@tritek.in Web: www.tritek.in

TRITEK UNIVERSAL AMPLIFIER SETTING AND MAINTENANCE

1. CIRCUIT DESCRIPTION:

Tritek UNIVERSAL AMPLIFIER has been specially designed to interface with a wide range of electro-proportional hydraulic valves. It has got 2 channels (normally used for pressure and flow coils). But it can also be used for controlling 2 pressure coils or 2 flow coils or even single pressure or flow coil.

The basic function of the amplifier is to maintain constant current through the proportional valve coil. The pressure or flow from the valve is proportional to the current flowing through the coil. The value of the current depends on the input signal and control settings of the amplifier.

The amplifier circuit is divided into 3 parts

The power input to the amplifier is 24 V DC. Using onboard power supply 3 voltages (+48 V, +12 V and -12 V) are generated. +/- 12 V supplies are used for internal control circuit of the amplifier. +48 V supply is used for supplying power to the coils.

The input signal (0 to 10 V) is first passed through slope control circuit.(Ton / Toff circuit) This circuit is used to control the rising and falling slope of the current passing through the valve coil.

The minimum value set is then added to the signal. Dither signal is added too. Dither signal is a triangular waveform having frequency of about 100 Hz. The resultant signal is then fed to the switching current regulator which controls the current through the valve coil.

To protect the amplifier from accidental coil short circuits and poor ventilation in the panel an over temperature protection circuit has been incorporated in the amplifier. When the amplifier gets overheated

2. SPECIFICATIONS:

1. Power Input- +24V dc +/- 10 %
2. Signal Input- 0 to +10V dc
3. Output Current- 0 to 800 mA across 10 to 43.5 Ohm coil
4. Dither Frequency- 90 to 120 Hz Fixed.
5. Dither Amplitide- 0 to 25 % of full scale fixed.
6. Operating Temperature- 0 to 45 Degrees Celcius ambient

Tritek Micro Controls Pvt. Ltd.
4051, Bhandup Indl. Estate,
Pannalal Compound, L.B.S Marg,
Bhandup (W), Mumbai-400078. INDIA
Tel- +91-22- 25968568, 25965737, 25968384.
Fax- +91-22-25962847
Email: tritek@tritek.in Web: www.tritek.in

3. INSTALLATION:

The amplifier card should be mounted in the panel in such a way that the heat sink (black aluminum plate mounted on the card) fins are vertical. Enough open space should be provided around the card for proper ventilation. Exhaust fan should be provided for cooling. 1 Amp. dc ampere meters should be installed in series with each proportional valve coil for displaying current through the coil.

4. CALIBRATION FOR PRESSURE SIDE:

Following steps should be followed for calibrating the pressure side of the amplifier.

1. Set MINIMUM, MAXIMUM, Ton and Toff presets to ZERO position. (Fully clockwise)
2. Keep the DITHER preset in center position.
3. Apply full input signal of 10 V to the pressure input.
4. Gradually increase the MAXIMUM preset (rotate anticlockwise) while observing machine pressure on the pressure gauge. Stop when desired maximum pressure is reached. Watch pressure coil current too. It should not exceed its maximum rated value. If desired pressure is not observed even at maximum current then check the hydraulic side.
5. Remove the input signal. Main calibration is now complete.
6. The MINIMUM, Ton and Toff settings can be adjusted later on based on individual machine requirements.

5. CALIBRATION FOR FLOW SIDE:

Following steps should be followed for calibrating the flow side of the amplifier.

1. Set MINIMUM, MAXIMUM, Ton and Toff presets to ZERO position. (fully clockwise)
2. Keep the DITHER preset in center position.
3. Without any input signal set the minimum current as given in valve literature by adjusting the MINIMUM preset.
4. Calculate full scale current as given in section 4
5. Apply full input signal of 10 V to the flow input.
6. Gradually increase the MAXIMUM preset (rotate anticlockwise) while observing flow coil current. Stop when desired full scale current is reached.
7. Remove the input signal. Main calibration is now complete.
8. The Ton and Toff settings can be adjusted later on based on individual machine requirements.

Tritek Micro Controls Pvt. Ltd.
4051, Bhandup Indl. Estate,
Pannalal Compound, L.B.S Marg,
Bhandup (W), Mumbai-400078. INDIA
Tel- +91-22- 25968568, 25965737, 25968384.
Fax- +91-22-25962847
Email: tritek@tritek.in Web: www.tritek.in

6. MAXIMUM CURRENT CALCULATION FOR FLOW COIL:

Flow coil requires certain minimum current below which the valve will not respond. This current is the Imin current.

The maximum current will depend on valve capacity and maximum input flow. Suppose valve capacity is "X" LPM and maximum input flow to the valve is "Y" LPM. And the maximum rated current of the valve is "Imax". Then calibration current can be calculated by the following equation.

Ical = Imin + (Y / X) * (Imax - Imin)

Hence if valve capacity (X) is 125 LPM.
Maximum input flow (Y) is 56 LPM.
Minimum valve current (Imin) is 200 mA.
Maximum valve current (Imax) is 680 mA.

Ical = 200 + (56 / 125) * (680 - 200)= 415.04 mA

7. TROUBLE SHOOTING AND FAULT FINDING:

To detect the faults and to decide if the amplifier is faulty use the following steps.

1. Check the current flowing through the proportional valve coil. If required current (as decided by the input signal and calibration) is flowing and desired function is still not taking place then fault does not lie in the amplifier.

2. If the current is not flowing then check the leds glowing on the amplifier. (as shown in the drawing)

Red led for +24V in should be ON. If it is off either + 24 V fuse is blown. Check and replace it if faulty. Or supply is not reaching the amplifier or + 24V supply polarity is reverse.

Red led indicating overheating should be OFF. If it is on it indicates amplifier overheating. Switch off power and wait for some time for it to cool down. In normal course amplifier does not get overheated. Hence check the cause of overheating. Most common cause is short circuit at coil terminals. This can occur if the ampere mater is connected in parallel to the coil. It must be connected in SERIES with the coil. If after cooling down the amplifier

Tritek Micro Controls Pvt. Ltd.
4051, Bhandup Indl. Estate,
Pannalal Compound, L.B.S Marg,
Bhandup (W), Mumbai-400078. INDIA
Tel- +91-22- 25968568, 25965737, 25968384.
Fax- +91-22-25962847
Email: tritek@tritek.in Web: www.tritek.in

works normally provide proper ventilation in the panel. If overheat led continues after cooling down it indicates amplifier circuit failure. This normally happens when wires connected to over temperature sensor break. The amplifier can be temporarily operated by short circuiting temperature fail override points.

Green led indicating +48 V should be ON. If off (without overheat) indicates amplifier failure. This fault is not site repairable.

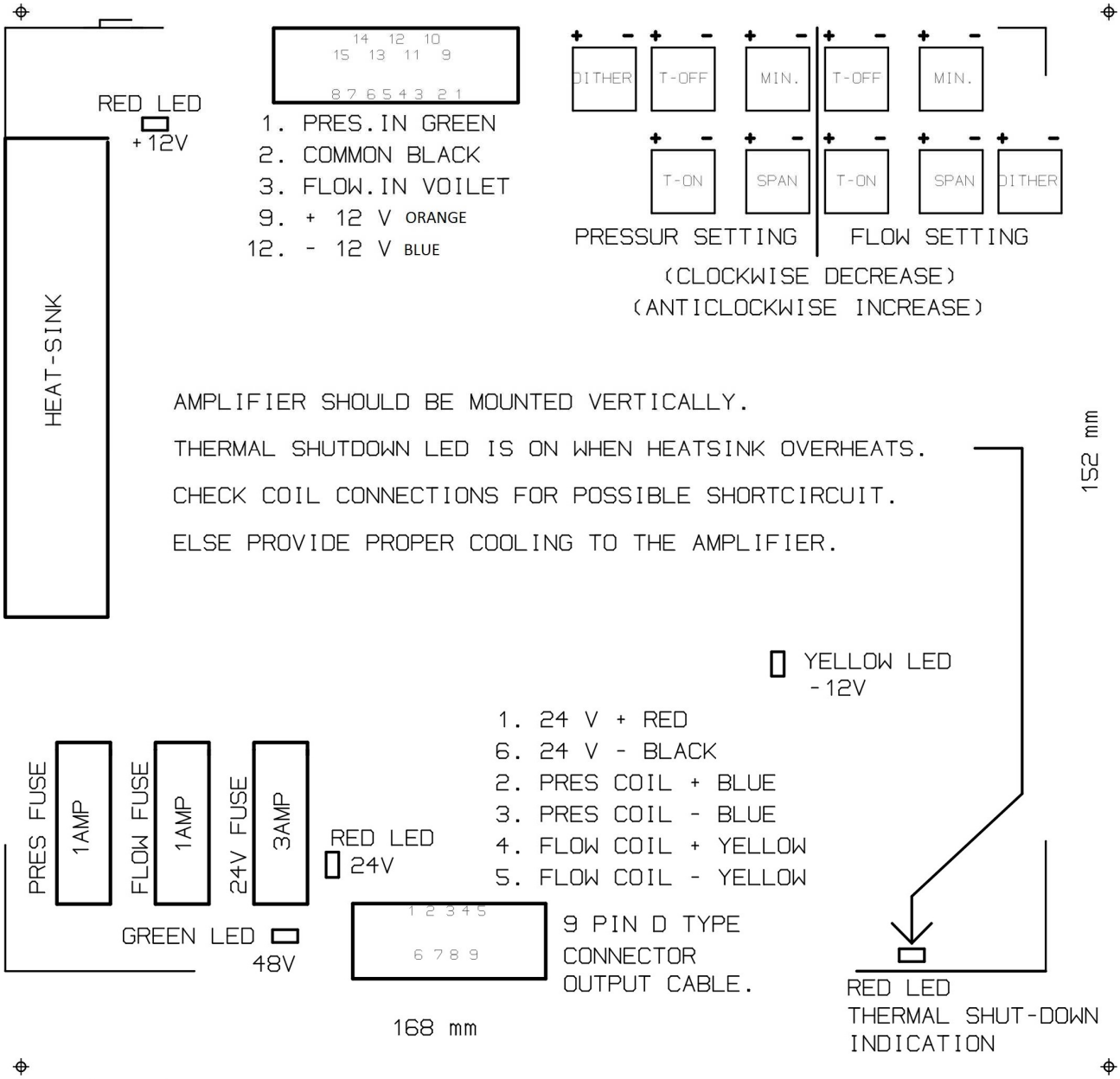
Red led indicating +12 V should be ON. If off (without overheat) indicates amplifier failure. Most likely cause is failure of +12V regulator (7812) mounted on the heatsink. If possible change it.

Yellow led indicating -12 V should be ON. If off (without overheat) indicates amplifier failure. Most likely cause is failure of -12V zenner diode mounted near this led. If possible change it.

3. If current is not flowing through the coil in spite of the above tests then check the fuse for that coil. Replace it if blown. Next check the current meter link of that channel. The 2 current meter points should be short circuited for proper operation. Next check the wiring for loose wires. Current will not flow unless wires are reaching the coil without any break.

4. If pressure or flow is slow to rise or fall readjust Ton and Toff presets for desired rise and fall patterns.

Tritek Micro Controls Pvt. Ltd.
4051, Bhandup Indl. Estate,
Pannalal Compound, L.B.S Marg,
Bhandup (W), Mumbai-400078. INDIA
Tel- +91-22- 25968568, 25965737, 25968384.
Fax- +91-22-25962847
Email: tritek@tritek.in Web: www.tritek.in



Crystal Corporation.
D:\PCPRO2\AMP_DIG.PCB
1-18-2008 15:19