

USER MANUAL

RELAYS PTC

MODEL:

PWR08

1) **AUXILIARY POWER SUPPLY**

AUXILIARY POWER SUPPLY

- Rated voltage 24-240 Vac-dc
- Maximum ratings 20-270 Vac-dc
- Vdc with reversible polarities

INPUTS

- 3 serie of PTC inputs:
 - 1 serie for ALL1
 - 1 serie far ALL2
 - 1 serie far FAN
- removable rear terminals
- input channels protected against electromagnetic noises and spikes

TESTS AND PERFORMANCES

- assembling in accordance with CE rules
- protection against electrical and magnetic noises CEI-EN50081-2/50082-2
- dielectric strength 2500 Vac for 1 minute from relays to sensors, relays to power supply, power supply to sensors
- ambient operating temperature -20°C to $+60^{\circ}\text{C}$
- humidity 90% no-condensing
- ABS self-extinguishing housing — NORYL 94VO
- Opt. Protection treatment of electronic part
- Frontal in polycarbonate - IP54
- Burden 2 VA
- Data storage 10 years minimum
- SeIf-diagnostic circuit

DIMENSIONS PWRO8

- 90 x 105 mm DIN 43700 prof. 75 mm

OUTPUT

- 2 alarm relays (ALL1-ALL2)
- 1 alarm relay for fan control (FAN) with time delay off (5-10-20-40 min)
- output contacts capacity: 5A-250Vac res.

DISPLAYING AND DATA MANAGEMENT

- Led indicating alarm. Trip channel or fan
- Led indicating fault
- 2 alarm thresholds
- 1 alarm ON threshold for fan control
- entering the programming by frontal push button
- automatic output from programming cycle after 1 minute of no-operation

The PWR08 is the most advanced unit on the market as regards temperature monitoring units for MT cast resin transformers, which utilize PTC sensors. The unit gives the ALL1 pre-alarm and TRIP signals when the temperature limits pointed out by the PTC of the windings are reached. The PWR08 is arranged to control the cooling ventilation of the transformer. The unit controls continuously the efficiency of PTC sensors and when one of these is defective, you have immediately a signal of defective sensor. The FAN relay is energized until temperature is superior than δNAT value; when the temperature gets down under this value the relay is still energized for the established ventilation time (5-10-20-40' delay function). As the PTC actually produced by all the European manufacturers have different specifications among the Power is not answerable for wrong functioning of the control system, caused by PTC with different resistance values, from those indicated in **TAB.1**

2) USE AND PROGRAMMING

- A) PWR08: FAN programming cycle
- B) PWR08: Alarm relay test
- C) PWR08: FAULT PTC sensor
- D) PWR08: diagnostic device for PTC

ITEM "A"

NOTE: PB.=push button / MOM=momentary / CONT.=continuously

POS.	ACTIONS	RESULTS
1	give voltage to the unit	the GREEN led lights
2	push mom. the P.B. L.TEST two times	the red led PRG/T.FAN light flashing
3	within 5" push the P.B. until the led PRG/L.TEST is lighted fixed	the led PRG/L.TEST is lighted fixed
4	push mom. the P.B. L.TEST	the red led switches from T1÷T4 (FAN time 5'÷40')
5	stop the push the P.B. when the led is ON, the Tx corresponds to the requested time	
6	end of FAN cycle programming	all the leds are switched OFF

IF YOU DO NOT NEED ANY FAN CYCLE

When you are at the point 4, you have one passage without any led lighted ON. The unit is programmed only for L1 and L2 (alarm and disconnecting)

ITEM "B"

1	push the P.B. mom. three time in sequence	the leds T1,2,3,4 are lighting in sequence
2	within 5" push cont. the P.B. until the leds are lighting all together	the leds T1,2,3,4 are lighting all together
3	after 5" the relay FAN is ON then L1/L2 are ON	leds and relay of FAN-L1-L2 are ON
4	end of "TEST CYCLE"	all the red leds are light OFF

ITEM "C"

1	One of the PTC is in Short Circuit	The red led FLT and the corresponding led (L1-L2-L3-L4) are flashing
2	Replace or repair the PTC	The leds are light OFF

ATTENTION:

if you PWRO8 has not the right PTC model connected, the leds lighten the PTC temperature at delta NAT+T=1300ohm.

COOLING FAN CYCLE "DELAY ON"

	the PTC/FAN is ON	the FAN relay is ON and the red led is switched ON
	the temperature decreases under the PTC value	the FAN relay remains ON for the fixed time and the red led flashing until the end of the selected time
	if the temp. raises again over the PTC val.	the ed stops to flash and remains fixed

ITEM "D"

The PWR08 is provided, in the standard version, with the option diagnostic device for PTC connected.

This software device could be connected or not with the following easy procedure:

to disconnect the diagnostic device for PTC give power supply to the unit pushing the L/TEST button and keep it pushed till the YELLOW FAULT LED is ON.

to connect the diagnostic device for PTC give power supply to the unit pushing the L/TEST button and keep it pushed till ALL THE LED are OFF.

3) ALARM 1 RELAY FUNCTIONING

The ALL1 relay operates when the unit is powered with the N.O. contact OFF.

The relay de-energizes and the contact is OFF when there is an alarm of the L1 PTC or when the unit is damaged. The ALL1 relay has the function of the PTC sensor FAULT.

If this relay operates during the lighting of the frontal FAULT LED, it means that there is an error in the reading or the PTC sensor.

It is possible to find it, thanks to a second lighting which corresponds to the FAULT channel.

4) ALARM RELAY 2 (TRIP)

The ALL2 relay operates when there is an alarm on the L2 PTC.

5) FAN RELAY

During the programming, it is possible to plan the cooling time or to take the FAN option OFF.

If the FAN is OFF, the relay doesn't operate. for this reason the respective PTC can be left out. If the FAN is ON, the relay operates from the first signalling of the respective PTC and the FAN led is ON. The relay is ON during all the time in which the PTC indicates the threshold overcoming. When the PTC checks the normal temperature, the PWR08 unit keep the relay ON for all the time signed during the programming and the FAN led lightens.

When the time is expired, with a normal temperature, the relay doesn't operate anymore and the LED switches OFF.

6) DIAGNOSTIC DEFECTIVE PTC SENSORS

If one a the PTC is in short circuit or it is interrupted you have the following signaling:

PTC alarm ALL1 Fault led + ALL1 flashing

PTC trip ALL2 Fault led + ALL2 flashing

PTC fan FAN Fault led + Fan

The trouble is not signalled, if one of PTC serie is interrupted when its total resistance are already TRIP threshold.

7) WARRANTY

The "PWR" units under warranty for 24 months from the delivery date signed on the unit.

The warranty is recognized when the unit breaks down due to some production faults or insufficient calibration, the warranty is not valid when tampered with or when it has been damaged for a wrong sensor connection or wrong power supply, out of the max working limits (20-270 Vac-dc). The warranty is not valid when the unit has been eliminated by excessive transitory voltage. In this case Power is not answerable for damages caused by faulted or defective unit. All the delivery expenses (there and back) of the unit must be paid by the Customer. (ANIMA prices Col.C).

PS: In order to verify the functioning of the unit we suggest the use of our simulator mod. SIM-PTC.

8) IMPORTANT NOTICE

Before making the insulation test on the electrical panel on which the unit is installed, you must take it off from the power supply line, in order to keep it out of damage.

9) TEMPERATURE SENSOR "PTC"

We can compare the PTC to the electronic bimetallic thermostat, which contacts close or open in a range of temperature, that is their work characteristics ($\delta NAT = \text{working temperature}$). The thermostat is set only for one working temp, which can change from 60 up to 180, with increasing steps of $10^{\circ}C$ (60-70-80-90-100-110-120-130-140-145-155-160-170-180). The bimetallic thermostat has the electric contact that opens or closes at different temperatures, always around \pm of the working temperature (δNAT). The difference between the opening and the closing temp. Represents the working differential of the thermostat (ΔT°). Highly accurate and expensive bimetallic thermostats are able to control the temp. between $\pm 1^{\circ}C$ of δNAT . The common bimetallic thermostat has control accuracy, that is $3 \div 5^{\circ}C$. The PTC are electronic temp. sensors, which change their electric resistance depending on the temp. Picked up. The δNAT does exist, as for the bimetallic thermostat, so for the PTC. The PTC do not allow an accurate temp. control, because their ohmic characteristic values are fixed to $-5^{\circ}K$ to $+5^{\circ}K$ of δNAT . The characteristic resistance values of the PTC are defined by the Norme DIN 44081/44082. Being very steep the PTC curve, in the out line included between $\delta NAT -5^{\circ}$ and $\delta NAT +5^{\circ}$, makes the control in a temp. range lower than $\pm 5^{\circ}K$ very difficult. If they are used in alarm system, obviously the PTC do not assure high accuracy.

10) TECHNICAL SPECIFICATION FOR "PTC"

TEMPERATURE	RESISTANCE Ω	VOLTAGE TEST VCC
From -20 to $\delta NAT -20^{\circ}K$	From 20 to 250	≤ 2.5
At $\delta NAT -5^{\circ}K$	≤ 550	≤ 2.5
At $\delta NAT +5^{\circ}K$	≥ 1330	≤ 2.5
At $\delta NAT +15^{\circ}K$	≥ 4000	≤ 7.5 impulse voltage
Electrical insulation		2500 Vca
Maximum working voltage		30

11) PTC RESISTANCE VALUES ACCEPTED TO CONWECT THE PWR08 (TAB.1)

FUNCTION	RESISTANCE Ω FOR SINGLE PTC OR MULTIPLE IN SERIE
NO ALARM Temperature of the machine under the alarm set	HIGHER THAN 50 Ω
ALARM Alarm set reached for FAN-ALL-TRIP	HIGHER THAN 1800 Ω
FOC Sensor circuit = Open Circuit	HIGHER THAN 200K Ω With fast increase $\leq 3''$
FCC Sensor circuit = Short Circuit	LOWER THAN 15 Ω

12) SIM.PTC ELECTRONIC SIMULATOR FOR PTC FOR MONITORING UNITS MOD. PWR08

This simple and economic PTC simulator, has been realized for testing the functioning of the temp.electronics units Mod.PWR08. The external switches insert, step by step, different resistance values that are in accordance with the working program of the unit. This makes possible to simulate the complete functioning of the unit as well as to verify the PTC diagnosis circuit. The PWR08 has been engineered to make simple and uncostly the thermic control or electric units such as soon as the transformer reaches the temp. Values equal to the PTC δ NAT, fixed into the transformer windings. The PWR08 further provides to drive the fan cooling system, when it is equipped with the suitable PTC serie. It is also widly used for electric motors temp. Protection.

Unique in its kind the PWR08 makes the PTC status diagnostic. This detail gives to the unit, and than to the control system, a very high safety factor. To obtain all this, Power engineering staff made a wide research and a deep study of the PTC produced in Europe. On the base of these studies, it has been fixed a PWR08 working program that allows the unit to work with almost all the PTC produced by European manufacturers.

13) HOW TO USE

Connect the multiple plug to the sensors input of the PWR08. Set the three switches on the NOR position.

In case the unit is NOR programmed for FAN Control, operate only with L1 and L2 switches.

14) ALARM TEST(L1 & L2)

Set the switches L1 and L2 on the TRIP position. On the PWR08, the L1 and L2 Ieds light ON, and the corresponding relay switches ON.

15) FAN TEST

Set the switches FAN on the position TRIP. The FAN led on the PWR08 will light fixed. The FAN relay switches ON. Fix the FAN switches on the NOR position; the FAN led starts to flash for a time corresponding to the programmed one (FAN CYCLE). At the end of the programmed FAN time, the FAN led stops to flash and goes OFF; the FAN relay returns to N.O. position.

16) SENSORS DIAGNOSTIC

The PTC sensors have two possible failures: one open circuit (Foc) and the other is short circuit (Fcc).

On the simulator there are two Foc conditions: the first is referred to the resistance value higher than 200 K Ω that simulates the PTC resistance value at $\delta NAT + 30/40^{\circ}C$. We match this condition on the PTC FAN when, being running the cooling fans, the transformer continues to increase its temp.

In this condition the temp, Monitoring unit does not give alarm, neither stops the ventilation. The same working philosophy is applied to L1 and L2 PTC.

The Foc2 position simulates the PTC circuit undoubtedly open. In order, to simulate the PTC open circuit and to verify the corresponding indication on the PWR08, you must move rapidly the switch from the position NOR to Foc2.

The PWR08 will show with flashing led. which of the three PTC (or serie) is definitely open.

In this case the L1 relay shall switch in pos. 6-7.

It is useful to repeat what we already mentioned in the instruction manual, that's to say that when a PTC reaches and overcomes the δNAT .

If it happens a Foc/Fcc condition the Fault will be not displayed.

This auto-diagnosis program performance allows to give the display priority to the ALARM and FAN functions. If, during the simulation. the PWR08 does not react in a proper way please contact Power.

RESISTANCE VALUES OF SIM-PTC

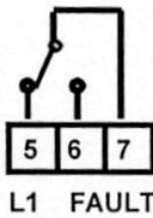
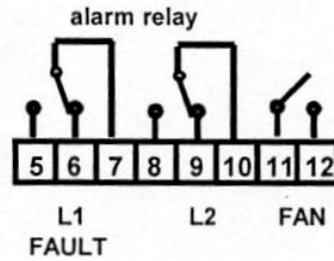
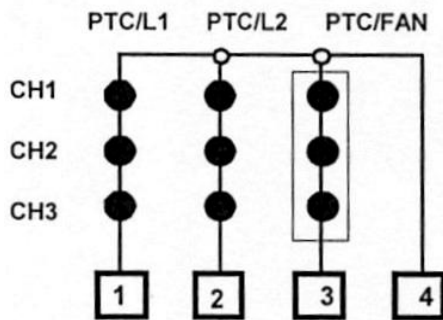
FUNCTION	RESISTANCE VALUES [Ω]
TRIP	2,0 K
NOR	220
FCC	4,8
FCO 1	500 K
FCO 2	∞

PWR08 TEST DESCRIPTION

The unit was submitted to the following tests during the production :

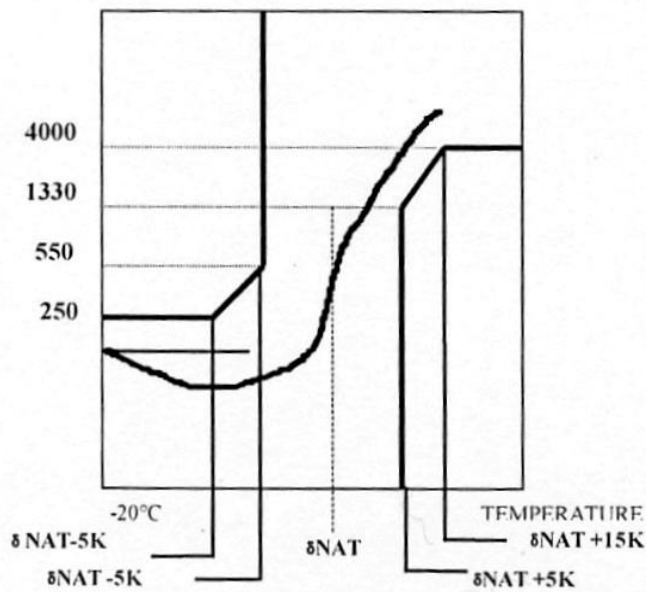
Number	DESCRIPTION
1	PC board test
2	Input test
3	Test of relay contacts and outputs
4	Key test
5	Lamp test
6	Calibration at 100 and 200° (for temperature monitoring units)
7	Software test
8	Burn - in minimum 24 H.

PTC electrical connection



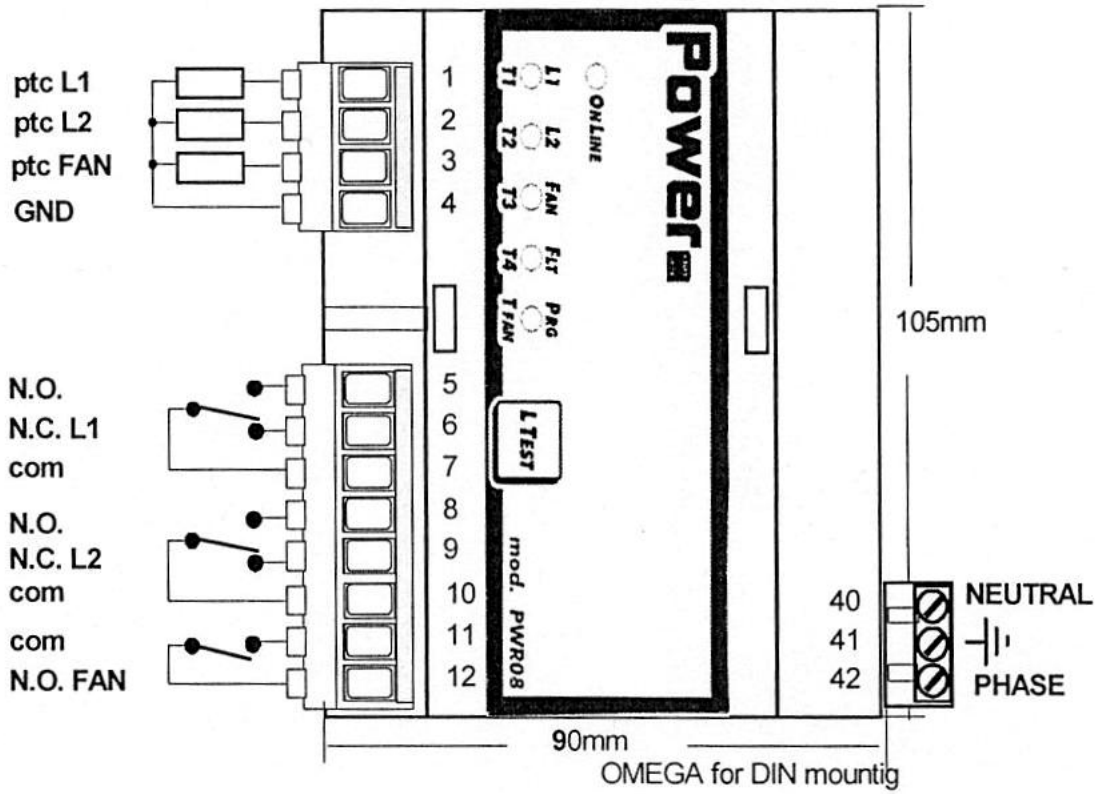
WHEN THE POWER SUPPLY IS

42	R	POWER SUPPLY
41	G	24-240 VAC/DC
40	N	



ELECTRICAL CONNECTION MOD. PWR08

Front side



N.B.:L1 RELAY IS USUALLY ENERGIZED

Lateral sight

