TE05 PUMP PROTECTION RELAY

OVERVIEW

Congratulations for owning an AC/DC Dynamics TE05 Phase Angle / Pump Protection Relay! This relay provides full protection for your submersible borehole pump and motor. With high repeat accuracy. Its features include:

- Low water (dry running) protection.
- Blocked inlet/outlet protection.
- High and low voltage protection.
- Motor Overload protection.
- Locked motor protection
- Single phase protection(400 model)

* Rapid Cycle protection.
* Adjustable dry re-start timer.
* Automatic calibration.
* LED fault and relay status indication.
* External reset Facility.

During the normal operation, the "Relay On" LED will indicate when the pump is not running. If a fault occurs, the relay de-energises and the LED indicates the cause of the fault. In most cases, the relay starts again after the fault has cleared or after a set time. On serious errors, the relay will not restart until the relay is manually reset.

The TE05 will give you many years of service and is guaranteed for 12 months against faulty workmanship and materials. In addition, a full repair service is available through any AC/DC Dynamics Branch.

Borehole DOL Starter with TE05 Protection	
TE05M	Pump controller for 230V single phase motors up to 0.75kW
TE05M-1	Pump controller for 230 V single phase motors for 1.1 to 2.2kW
TE05Q	Pump controller for 400V three phase motors up to 4kW
TE05Q-1	Pump controller for 400V three phase motors for 5.6 kW

INSTALLATION

THE TE05 should be installed by a competent electrician in accordance with the relevant diagram. External start/stop circuits (e.g. pressure switch or liquid level relay) may only be used where shown. Deviation will cause failure to calibrate and /or nuisance trip. The externally mounted reset button is for manually resetting the TE05 when it has tripped on overload without disconnecting the power supply.

When connecting for the pressure switch control, the pressure switch contacts should close on low pressure and open on high pressure.

CALIBRATION

This unit is supplied un calibrated. When first switched on, the TE05 will ask to be calibrated by all the LEDs coming on and the relay energizing. If calibration has not been done within 5 minutes, the relay de-energises to protect the motor. To calibrate, the TE05 must be switched on and the pump allowed to reach its normal running condition. Press and hold the SET button on the front of the TE05 for longer than 5 seconds. The LEDs will now flash for about 15 seconds to show that the TE05 is calibrating. When the LEDs have stopped flashing, the TE05 is calibrated! To recalibrate at any time, simply repeat the calibration procedure.

To un calibrate, switch power off to the TE05. Press and hold the button. Switch the power on. Wait until the LEDs flash (approx.5 secs) and then release the SET button. The TE05 is now un calibrated.

If when calibrating, the relay de- energises AFTER 5 SECONDS and the LEDs switch off , this is because the TE05 is unable to calibrate due to the input current being too low or high (check CT selection and connections). If the relay de-energised AFTER 15 SECONDS and LEDs switch off, this is because voltage is too low or too high. When corrected, calibrate again.

Finally, the dry re-start timer must be set for the time it takes for the borehole water level to recover having run dry. This can be adjusted from 15 minutes to 24 hours.

OPERATION

1. **Low water /blocked inlet/ outlet protection.**
   The TE05 will detect the above conditions and switch off the pump within 2 seconds. The green "RELAY ON' LED will flash and remain doing so until the restart timing period has elapsed. The pump will restart and the green "RELAY ON" LED will stop flashing and remain on.
2. **Low current protection.**
   Typically caused by an abnormal light or faulty connection. If the current drops by more than 10% below the calibrated normal running current, the pump is stopped and the conditions is treated the same as (1) above.
3. **Motor overload protection.**
   In the event of a locked rotor or current exceeding 20% of calibrated normal running current, the pump is switched off in one second and the red "OVERFLOAD" LED comes on. This condition remains until it is manually reset by the external reset button or by disconnecting the power supply.
4. **Low or High Voltage protection.**
   To protect the motor, if the supply voltage increases by more than 10% of normal, the pump will be stopped and the /fs"|amber "OVER OR UNDER VOLTS" LED will come on. When the voltage has stabilized within safe limits, the amber LED switches off and the pump automatically restarts.
5. **Rapid cycle protection.**
   Excessive starting damages a motor. The TE05 protects your pump by limiting the number of starts to 12 per hour. When the pump is started more than 3 times in a 15 minute period, the relay de-energises and the amber light flashes for 15 minutes. After this period, the pump can restart. During commissioning, this feature can be bypassed by interrupting the supply to the TE05. Note that this feature does not function when there is a pressure switch or similar contact in the incoming line supply.
6. **Single phasing and phase failure protection. (400V model only)**
   When any of the phases are disconnected, the relay de-energises and the pump stops. Either the green LED will flash or the red LED will stay on. This condition is reset once the fault has been cleared and supply reconnected.

GREEN	AMBER	RED	
ON	OFF	OFF	Normal pumping
FLASH	OFF	OFF	Dry- timing or phase failure / reversal
OFF	ON	OFF	Supply voltage low/ high
OFF	FLASH	OFF	Rapid cycle
OFF	OFF	ON	Motor overload
ON	ON	ON	TE05 un calibrated
FLASH	FLASH	FLASH	TE05 calibrated
OFF	OFF	OFF	TE05 unable to calibrate

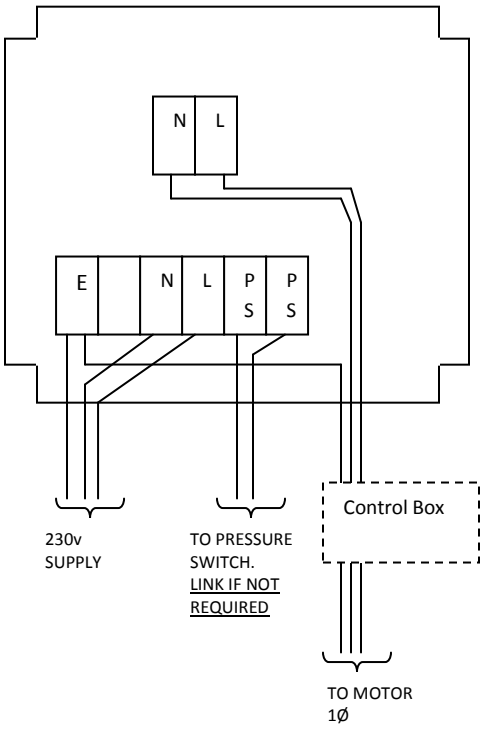
TE05 BOREHOLE PUMP STARTER SPEIFICATIONS

Supply voltage:	Single phase: 230VAC ±20%		Three phase: 400VAC ±20%
Power consumption:	3VA		
Calibration:	Automatic- activated by pushbutton		
Dry trip level:	Calibrated phase angle and current – 10%. 2 seconds delay.		
Voltage trip level:	Calibrated voltage ± 10%, 2 second delay.		
Current trip level:	Calibrated current ± 20%, 1 second delay.		
Rapid cycle:	3 starts per 15 minutes maximum.		
Dry restart delay:	Adjustable 15 minutes to 24 hours.		
Output contact rating:	TE05M	0.75kW max 230V	10Amp SPDT @ 250VAC. Maximum switching voltage = 400VAC
	TE05M-1	1.1-2kW 230V	18 Amp AC3 @ 500VAC. Two pole connected in parallel per phase.
	TE05Q	4kW 400V	9 Amp AC3 @ 500VAC.

CONNECTION DRAWINGS

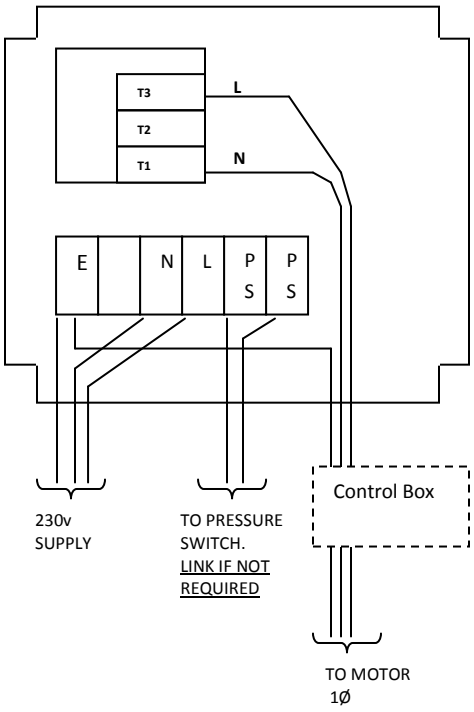
TE05M

For single phase motors up to 0.75kW 230V



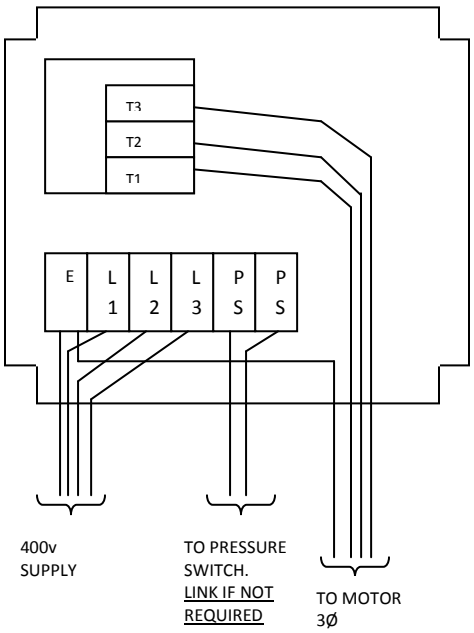
TE05M-1

for single phase motors between 1.1 and 2.2 kW 230V



TE05Q

For three phase motors up to 4kW max @ 400V



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