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TRIO PANEL

THREE PHASE / Up to 5.6kW / 400V

MOTORSCOPE®
THE RELIABLE ELECTRIC MOTOR GUARD

GENERAL INFORMATION

The power used by a working system varies with the application but must stay within safe limits. Power consumption outside of this range indicates a faulty motor or system.

The load or power consumption is measured at the input to the motor. When the calibration button is pressed, with the jumper in place, the MOTORSCOPE defines the safe range for the system. The motor must, at that time, run under normal working conditions. The power supply has to be correct and stable, this is checked continuously. The MOTORSCOPE keeps the motor running as long as the safe limits are not exceeded.

The MOTORSCOPE has a RS232 output for serial communication with our OPTIMIZER or a PC. The OPTIMIZER is used to improve settings, as an installation aid and for more detailed fault indication. The OPTIMIZER can carry the data of the last 43 motor stops to be transferred to a PC. DO NOT MOUNT THE UNIT IN FULL SUN!



AUXILIARY INPUT

LIQUID LEVEL
PRESSURE
TEMPERATURE
EARTH LEAKAGE

OPTIONAL: EVERY UNIT CAN BE FITTED WITH A BUILT-IN OPTIMIZER FOR YOUR CONVENIENCE!

PROTECTION

OVER- and UNDER-LOAD
OVER- and UNDERVOLTAGE
PHASE FAILURE
PHASE SEQUENCE
PHASE IMBALANCE
OVERHEATING (UNCONTROLLED STARTS)
NOT AGAINST LIGHTNING

TECHNICAL SPECS

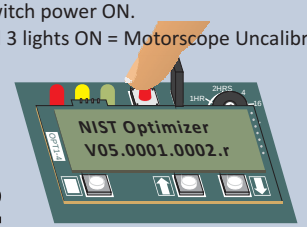
MOTOR VOLTAGE	:	L1- L2- L3 = 400V AC
CURRENT RANGE	:	1 - 15 Amp Inductive
POWER RANGE	:	0.25 - 5.6kW
FREQUENCY RANGE	:	40 - 70 Hz
CONSUMPTION	:	3VA
COS PHI RANGE	:	0 - 1 Inductive
TEMP RANGE	:	-15 to +70º C
MECHANICAL	:	Weight ±1.5kg
DIMENSIONS	:	158 x 238 x 100mm

BUILT-IN OPTIMIZER (optional) BASIC SETUP (See Optimizer Modes on p4)

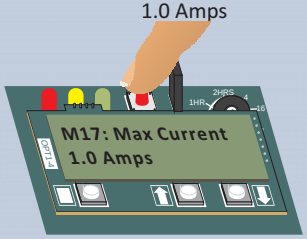
1
Switch Power OFF



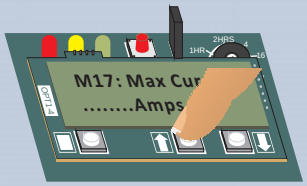
2
With power OFF, hold calibration button in & switch power ON.
All 3 lights ON = Motorscope Uncalibrated.



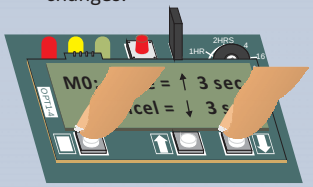
3
LCD Display shows: M17: Max Current 1.0 Amps



4
Press ↑ button: To set max amps allowed for motor.
Max amps + 10%



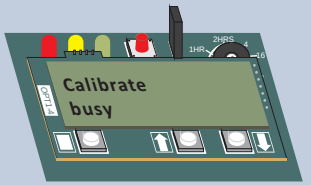
5
To save: Press ■ + ↓ to Mode 0.
Press ↑ for 3 seconds to save changes.



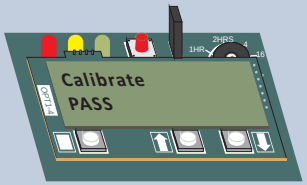
6
Press ↑ arrow for 3 seconds to start.



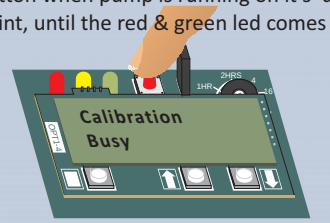
7
Screen displays



8
Motorscope is set and pump running.



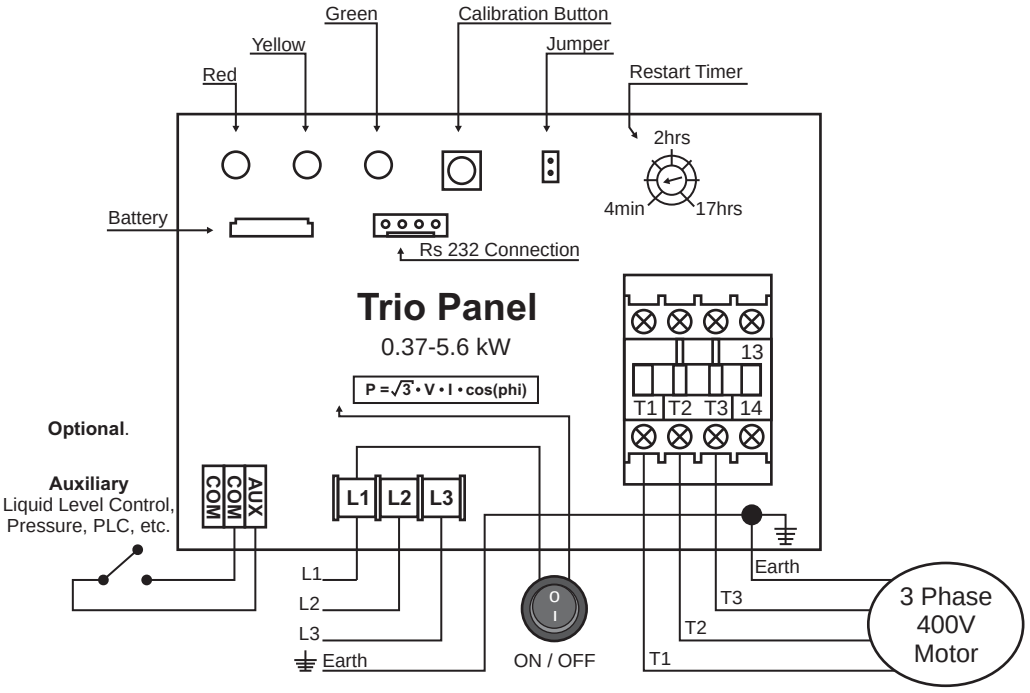
9
After 2 minutes, press the calibration button when pump is running on it's duty point, until the red & green led comes on.



10
When only the green LED is on, the calibration has been completed.



CONNECTION DIAGRAM



INSTALLATION INSTRUCTIONS

1. Connect the incoming power (L1, L2, L3 and Earth) to the Trio-panel as indicated on the diagraM on the left.
2. Connect the outgoing power to the motor as per diagram (Do not forget to earth the motor as indicated).
3. When all connections are properly fastened, proceed with the First Time Calibration (see instructions on p1).
4. For 0.37kW motors: L3 should go through the CT twice (in the same direction).

TO START OR STOP, USE THE ON/OFF

SWITCH AT THE BOTTOM OF THE ENCLOSURE.

IF ANY ERRORS OCCURRED DURING START-UP, SEE

POSSIBLE EXPLANATIONS AT THE BOTTOM OF THIS PAGE.

POSSIBLE ERRORS AT FIRST TIME CALIBRATION

● LIGHT ON ○ LIGHT OFF ✸ LIGHT FLASHING

NOTE: Start fault finding by checking that all wires and compressed copper connections are properly connected, and that the motor is calibrated at it's normal running condition.

LED Indication: Red Yellow Green	Reason	Possible cause	Solution
✸ ✸ ○ , **Red and Yellow lights flashing**	Voltage fault (When the supply voltage recovers and stays within the safe limits for 15 min, normal operation resumes.)	Supply voltage incorrect	Connect Earth(⏚) to COM. Phone your power supply company.
○ ✸ ○ , **Yellow light flashing**	Under-load / Restart timer	Bore-hole dry Broken belt/shaft	Set Restart-timer, for bore-hole to refill. Phone your motor's supplier
● ✸ ○ , **Red constant and Yellow flashing**	Current fault	Over current	Current exceeds safe limit.
○ ✸ ✸ , **Yellow and Green lights flashing**	Start delay	Too rapid restart	Leave on, unit restarts automatically.
● ● ○ , **Red and Yellow constant**	Phase rotation error	2 Phase wires interchanged	Interchange 2 phase wires at input power connector.
● ○ ○ , **Red constant**	Overload	Low voltage at motor Overload	Use a larger diameter cable to motor Check system or contact supplier.

BUILT-IN OPTIMIZER

HOW TO SET ANY OF THE PROGRAMMABLE MODES

1.	Mode 0 : Press ▲ to ENABLED.
2.	Move to the desired Mode that you wish to change by pressing ■ and ▲ / ▼ .
3.	Press ONLY ▲ or ▼ to change the value inside that mode.
4.	To store values, press ■ and ▼ to Mode 0.
5.	Press ONLY ▲ for 3 seconds to program new value.

ADVANCED SETUP

1.	Before continuing, first do the BASIC SETUP.
2.	To improve on the settings, the following modes are programmable:

M23	Date & Time
M21	Pwr L.Limit (Low Limit) or Dry run limit.
M20	Pwr H.Limit (High Limit) or Overload limit on Watts.
M17	Max. Current (Max. Amps).
M16	Trip Data (Download & Trip Data Display).
M15	Min Ph.Angle (Overload on Min Phase Angle). See Mode 6 for real time Phase Angle.
M14	U/L Allow T. (Underload Allow timer) or (Seconds allowed for RUN DRY).
M13	O/L Allow T. Overload Allow timer) or (Seconds allowed for OVERLOAD).
M12	Startup.Tmr (Default 3s startup) or (Yp to 9s for Star/Delta, Soft Start application).
M11	U/L Timer (Underload Timer) or (Setable H: min before switch on after an Underload/Dry Run
M10	CT Ratio (Current multiplication Ratio).
M9	AUX type (Auxiliary Input can be set to react on a normally closed or normally open contact - Potential Free).
M8	Delay Timer (Prevents overheating from too many starts). Press ▲ + ▼ together to disable or enable. 4 Trips @ 4 x CT Ratio (Time). This counts down while the motor is running or stationary. Programmable (Enabled/Disabled).
M0	Programming Enabled/Disabled.
NEW M24	Password. Press ▲ or ▼ to change. (Disabled by Default) The password is a binary code from 0 - 15 stated in 1's and 0's. For Example: Optimizer Code = 10 Password = 1 0 1 0 1 0 1 0 = 10 $2^0 = 1$ $2^1 = 2$ $2^2 = 4$ $2^3 = 8$ 2^3 2^2 2^1 2^0 = = = = 8 4 2 1 x x x x 1 0 1 0 → This is the password to enter into the Optimizer. = = = = 8 + 0 + 2 + 0 = 10 The Optimizer states: Code = 3 Put in the password 0 0 1 1