



Monitoring & Protection for AC Motors

## DESCRIPTION

The DMP Digital Motor Protection Relay is a multifunctional microprocessor based relay designed for the protection and management of practically all sized motor at significant cost & space savings. DMP Relay was designed to provide customer effective use of motors avoiding down time for nuisance tripping. To achieve this goal, the DMP performs the functions classified as follows:

## PROTECTIONS

- (14) Speed (External Module Required)
- (38) Bearing RTD Over temperature (External Module Required)
- (37) Undercurrent
- (46) Current Unbalance
- (49) Overload
- (49) Stator RTD Over temperature (External Module Required)
- (51) Phase Timed Overcurrent
- (51G) Ground Overcurrent
- (66) Multiple Starts (Starts/hour) & Time Between Starts
- (86) Total Lockout
- Acceleration Timer
- Mechanical Jam / Stalled Rotor
- Restart Block Timer

## METERING

- Motor Thermal Capacity Used
- 3 Phase & Ground RMS Currents
- Average Current
- Current Unbalance
- Negative Sequence Current
- Motor Load
- Equivalent Motor Load based on Negative Sequence Factor
- Estimated time to trip based on actual load
- Motor Status
- Motor Running Time
- Motor Starts Counter
- Stator, Bearing & Ambient Temperature (External Module Required)
- Motor Speed (External Module Required)

## ADDITIONAL FEATURES

- Automatic Restart after a power loss
- Auto-Transfer after Start Function for WYE-DELTA or additional starters
- Emergency Restart
- Thermal Capacity Additional Protection for Alarm, Trip or Control
- Automatic Learn of Motor Parameters (Starting Thermal Capacity, Starting Current, Starting Acceleration Time & Average Motor Load)
- Minimization of the Start Block time after an Overload Trip based on Learned Thermal Capacity.
- Real Time Clock
- Events
- Capacity for future expansion with External Modules
- DC power supply (on request)
- Front Panel Installation
- Reduced Size (96x48x100 mm)
- 3 Output contacts relays
- 1 Digital input for Contactor or Breaker Status
- 16x2 Alphanumerical LCD Backlight Display
- Touch pad programming
- 2 led for quick motor status visualization
- Indication and storage of fault conditions and their values

## COMMUNICATION

- 1 Infrared port for wireless communication
- 2 RS-485 ports for industrial wired communication
- Modbus RTU protocol (functions 03h, 04h, 05h, 06h & 10h)



Quality certified ISO 9001:2000

Protection relay  
DMP\_GBBR\_050805

## SPECIFICATIONS

### POWER SUPPLY

DC: 24, 48 Vdc, -15%, +10%  
AC: 115/230 Vac 50/60 Hz, -20%, +10%  
*must be specified with order*  
Power: 3VA or 3W

### PHASE CURRENT INPUTS

CT Primary Range:  
In = 1 to 400A with Standard CTs (supplied)  
(for different current contact Orion Italia )  
Nominal current input: 0,2 A  
System Frequency: 50 or 60 Hz  
Sensing: True RMS at 16 samples per cycle  
Burden: 0.2 VA at In, 1.5 VA at 8 x In  
Conversion Range: 0.05 to 8 x In  
Accuracy:  $\pm 2\%$  of In

### OVERLOAD PROTECTION (ANSI 49)

Curves: 13 curves, fixed shape.  
Pickup: 101 to 150% of FLC, steps of 1% (*Service Factor*)  
Pickup Accuracy: as per Phase Current Inputs  
Timing Accuracy:  $\pm 2\%$  of trip time or  $\pm 100$  ms

### MECHANICAL JAM

Pickup: 110 to 500% of FLC, steps of 10%  
Delay: 0.5 to 60 s, steps of 0.5 s  
Pickup Accuracy: as per Phase Current Inputs  
Timing Accuracy:  $\pm 0.5$  s

### PHASE TIMED OVERCURRENT (ANSI 51)

Curves: 12 curves (ANSI, IEC, IAC) + Definite Time  
Definite Time Range: 0.5 to 600 s, steps of 0.5 s  
Pickup: 100 to 600% of FLC, steps of 10%  
Pickup Accuracy: as per Phase Current Inputs  
Timing Accuracy:  $\pm 100$  ms

### GROUND OVERCURRENT (ANSI 51G)

Curves: 12 curves (ANSI, IEC, IAC) + Definite Time  
Definite Time Range: 0.03 to 500 s, steps of 0.01, 0.1 or 1s  
Pickup: 0.5 to 500A, steps of 0.1 or 1A  
Pickup Accuracy: as per Phase Current Inputs  
Timing Accuracy: +50 ms

### UNDERCURRENT (ANSI 37)

Pickup: 5 to 100% FLC, steps of 1%  
Delay: 1 to 254 s, steps of 1 s  
Start Delay: 0 to 254 s, steps of 1 s  
Pickup Accuracy: as per Phase Current Inputs  
Timing Accuracy:  $\pm 0.5$  s.

### MULTIPLE STARTS (ANSI 66)

Max. Starts per Hour: 1 to 10, Step of 1.  
Min. Time Between Starts: 0 to 240 min, Steps of 1 min

### CURRENT UNBALANCE (ANSI 46)

Pickup: 3 to 100%, steps of 1%.  
Delay: 1 to 254 s, steps of 1 s  
Start Delay: 0 to 254 s, steps of 1 s  
Pickup Accuracy:  $\pm 2\%$   
Timing Accuracy:  $\pm 0.5$  s

### ACCELERATION TIMER

Pickup: transition from Motor Load < 5% to Overload  
Dropout: when overload disappear  
Delay: 1 to 254 s, steps of 1 s  
Timing Accuracy:  $\pm 0.5$  s

### RESTART BLOCK

Delay: 0 to 7200 s, steps of 1 or 10 s  
Timing Accuracy:  $\pm 0.5$  s

### AUTOMATIC RESTART

Power Loss Time: 0.0 to 10 s, steps of 0.1 s  
Delayed Restart Time: 0 to 3600 s, steps of 0.1, 1 or 10s  
Timing Accuracy: +100 ms

### THERMAL CAPACITY ADDITIONAL PROTECTION

Pickup: 10 to 100% of TC, steps of 1%  
Pickup Accuracy:  $\pm 2\%$  of TC

### DIGITAL INPUT

Type: Dry contact  
Output: 9 VDC, 10 mA (latched)

### OUTPUT CONTACTS

Operation Time: 10 ms.  
Contact Material: Silver Alloy  
Rating Load (*Resistive Loads*):  
250 Vac 8A or 30 Vdc 8A  
Max. Switching Voltage: 250 VAC or 125 VDC  
Max. Switching Current: 8A

### COMMUNICATIONS

2 ports RS485 half duplex 1200 to 19200 baud  
1 InfraRed port  
Protocol: Modbus RTU  
Functions: 03h, 04h, 05h, 06h, 08h & 10h.

### DIELECTRIC WITHSTAND VOLTAGE: 2kVac, 60 s

**TERMINAL BLOCK:** Back connection, section 4 mm<sup>2</sup> or 12 AWG

**FRAME:** ABS auto-extinguish, polycarbonate frontal (IP54)

**ASSEMBLY:** The relay has to be jointed to the structure fixing it with the help of two (2) stirrup with screws (supplied with DMP).

**DIMENSION:** 96 x 48 x 100 mm.

**FRONT PANEL CUTOUT:** 92 x 45 mm.

**WEIGHT:** 500 g

**OPERATIONAL TEMPERATURE RANGE:** 0 to 50°C.

**STORAGE TEMPERATURE:** -20 to +70°C.

**RELATIVE HUMIDITY:** Max 90% no condensing.

**BURN IN:** 50°C for 48 hours.



### EMISSION TEST

- Radiated emissions  
References: EN 55011; Port : enclosure; Class A, at 10m
- Conducted emissions  
References: EN 55011; Port: AC mains; Class A

### IMMUNITY TEST

- Conducted disturbances induced by RF field  
References: EN 61000-4-6; Port: AC mains and signal lines
- Radiated electromagnetic field  
References: EN 61000-4-3; Port: enclosure
- Fast transients (burst)  
References: EN 61000-4-4; Port: AC mains and signal lines

### CONSTRUCTION:

The relay has been constructed following the standards VDE, UL, CEI.

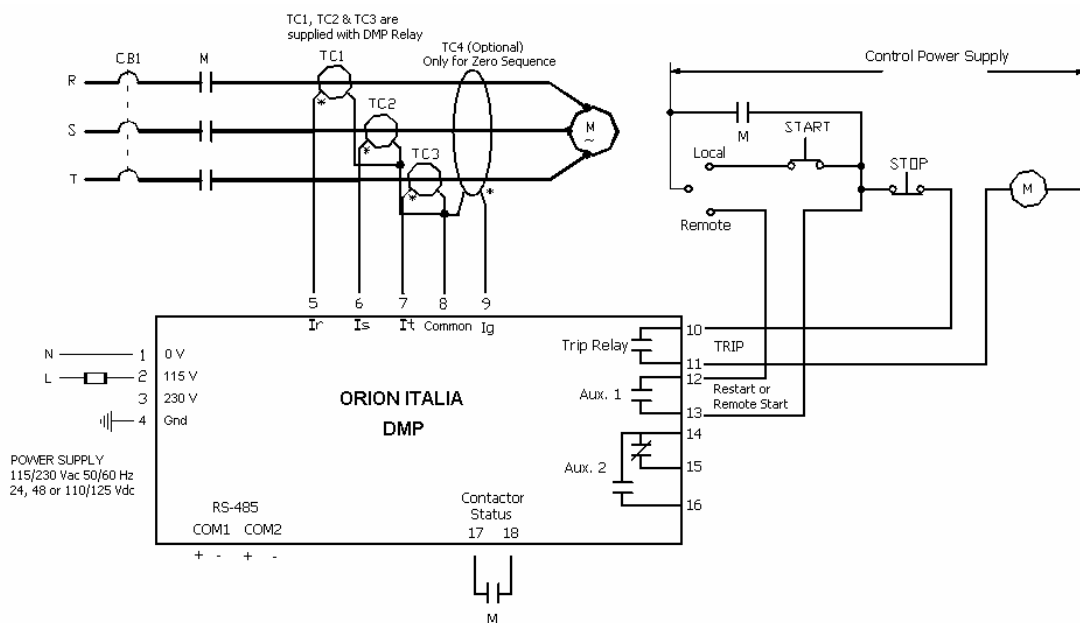
### ORDER CODE:

## DMP – A1

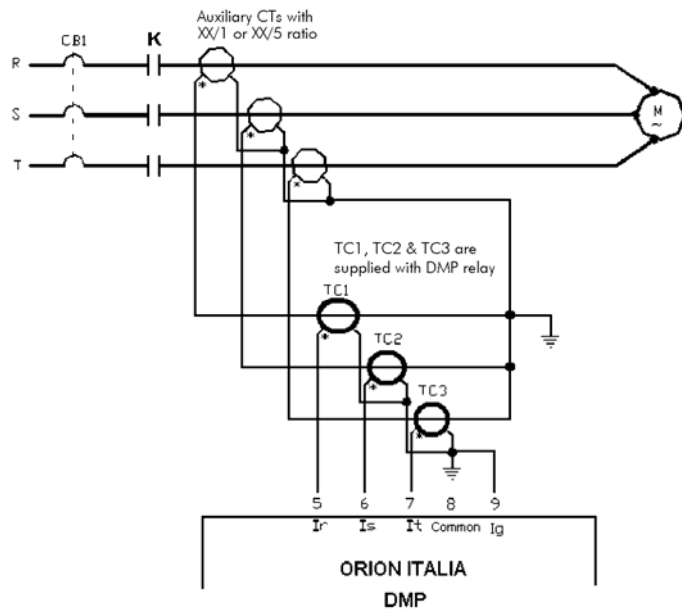
**MODEL**  
A: Standard

**POWER SUPPLY**  
1: 115/230 Vac  
2: 24 Vdc  
3: 48 Vdc

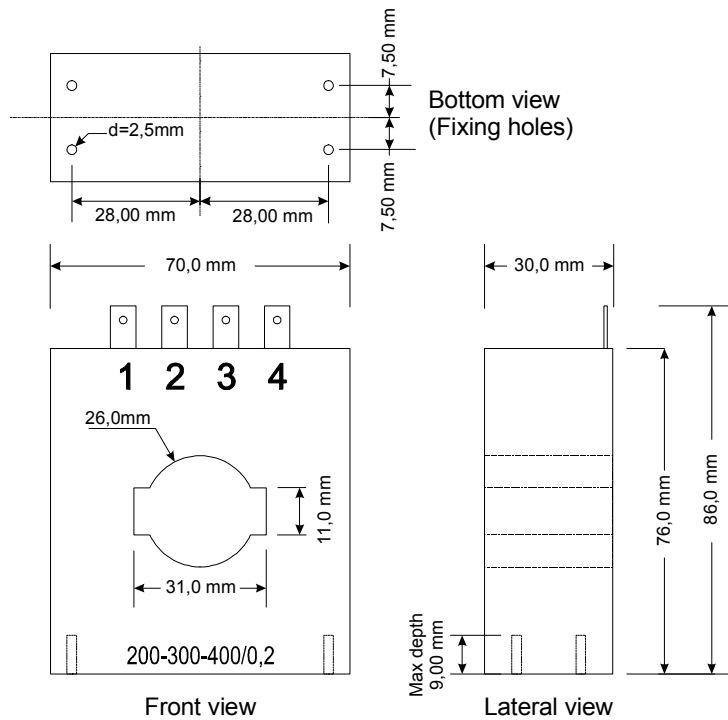
### SAMPLE WIRING DIAGRAM



Circuit Diagram for 3 Phase + Ground Sensing, Local/Remote Start + Restart Feature



Auxiliary CT xx/1 or xx/5 Wiring diagram, residual ground sensing



DMP standard CT overall dimensions