



MPR/MPC3000 Protection Relay

replacement for the MPR2000/MPC2000D

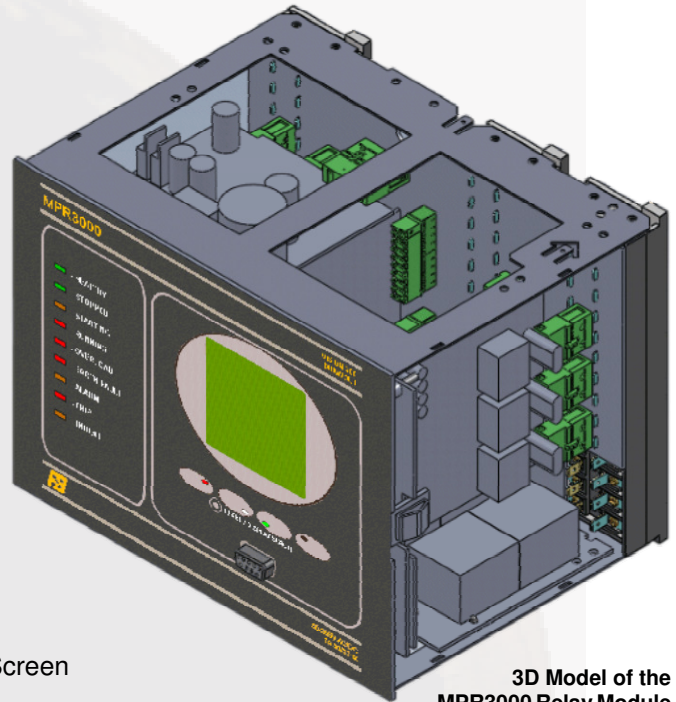
P&B Engineering's well established MPR2000 and MPC2000D relays are now replaced using technology from the highly sophisticated 'Vision' relay range. Offering cost effective, and versatile protection relays for both low and medium voltage switchgear.

The new MPR3000 and MPC3000 relays underpin our commitment to provide modern relaying solutions for older equipment.

Integral to the new design is the graphical LCD display which replaces the two line LCD of the older product. This allows for an intuitive menu structure with clear messaging and will display the energising current during a motor start.

The 3000 relay hardware consists of:

- 4x Output Relays with Changeover Contacts
- 5x Fixed Digital Inputs MPR3000 or
- 19x Fixed Digital Inputs MPC3000
- 5x Push Buttons for Navigable Menu Driven LCD Screen
- 9x Coloured LEDs for Indication and Status
- 1x Front Mounted RS232 Port
- 1x Rear Mounted RS485 Port for Modbus RTU or P&B Protocol
- 4x 1A or 5A CT Inputs
- 3x VT Inputs
- 5x RTD Inputs
- 1x Wide Ranging Power Supply 80-265V AC/DC or Low Voltage version



3D Model of the MPR3000 Relay Module

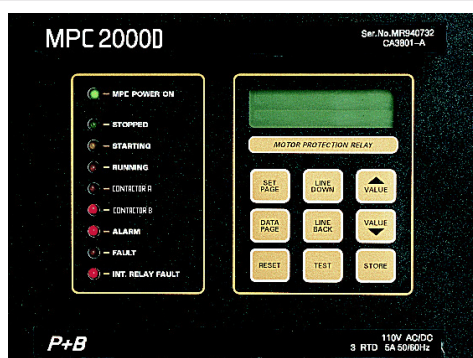
Designing the 3000 to be pin for pin compatible with the 2000 hardware means that any direct replacement is exceptionally straightforward. The lid mounted reset push button will align with the new relay and also act as a display scroll prompt allowing metered motor data to be viewed more easily than before.

Porting the proven technology from Vision allows the new 3000 to conveniently inherit the designs strengths, experiences and pedigree and also benefit from the same production and testing procedures and techniques. Core to the Vision design is the modular philosophy of pcb layout which lends itself very well to the shortened withdrawable case format.

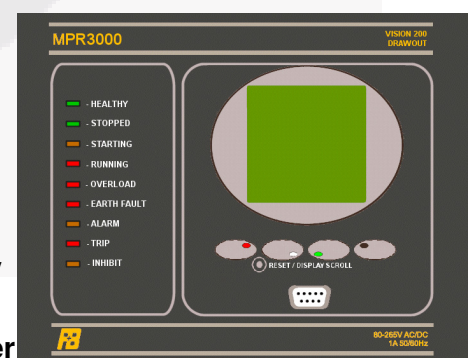
Borrowing one of the main strengths from Vision, the LCD interface, the 3000 relay will be familiar to existing Vision relay users as well as those more familiar with the 9 button, two line display and status LEDs of the 2000.

In order to simplify and reduce the amount of device options, for both the MPR3000 and MPC3000 the RTD inputs have been fixed as standard to 5 inputs. The digital inputs are wide ranging and auto-sensing. The PSU can either be ranged for operation at 80-265V AC or DC or an LV type can be fitted for voltages between 18-65V AC / DC. As with the 2000, the secondary CT connection rating should be noted during order as either 1A or 5A.

MPR2000 / MPC2000D



MPR3000 / MPC3000



Pin for Pin Equivalence
Identical Dimensions
Can Utilise Existing Case
No Wiring Changes
Familiar LED Indications
Intuitive Graphical Menu
Modern Relay Technology
Front RS232 Port
Smart Card Setting Transfer



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LCD Display

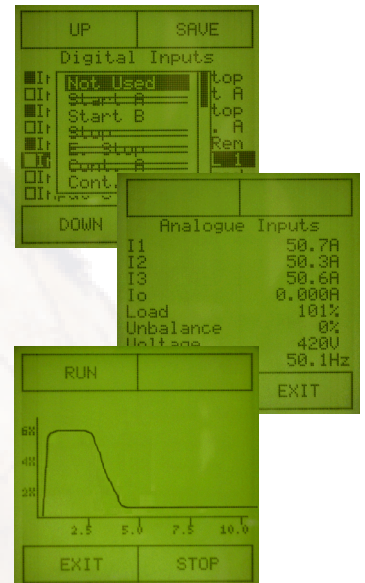
The navigable LCD menu is driven by the five push buttons, this allows access to measured and recorded data as well as providing a programming interface for the relay settings.

The menu is structured in an intuitive way to allow easy of use and understanding of the presented information. Where possible acronyms are not used, instead full text descriptions are displayed.

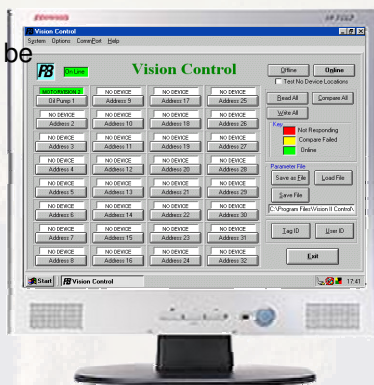
The front RS232 port can be used for local programming or data extraction as well as firmware updates.

The rear port is normally used for connection to a daisy-chained, twisted pair data highway which in turn is connected to SCADA or DCS systems or to a local electrical work station (EWS). This provides a route for direct remote circuit monitoring, telemetry or metering and consumption analysis.

In addition the Xcell Data Concentrator can be used as a protocol or host interface hub and allows many multiples of relays to be connected together. The Xcell is a fault tolerant and fully dual redundant system for relay communication.



Parameter Setting



Vision Control, P&Bs pc based programming tool can be used to program and configure multiple relays through either communication port. Settings can then saved, stored & printed.

A Smart Card facility is included within the relay to further aid programming or be used to collect statistical and recorded data. Settings are stored to a card and those settings can then be downloaded to relays of the same type and function. Card access is at the rear of the relay once withdrawn from the casing.

All necessary configuration can of course be carried out via the front keypad without the need for any external equipment.

The menu structure provides a very easy to use interface for inputting parameter settings as well as data interrogation.

Disturbance Recording

Each relay can be equipped with its own onboard disturbance recording facility. This provides up to 8 seconds of waveform capture and can be multi triggered and weighted pre and post fault. Each phase is individually recorded and can be extracted from the relay using the front RS232 port in a 'comtrade' format for analysis by any compatible software.

Environmental / Technical Data

Rated Inputs:

CT In = 1A or 5A
VT Vn= 110 - 415Vac 50-60Hz
Aux. Supply 80-265Vac, 90 -300Vdc

Withstand:

CT Cont 4x
10s 30x
1s 100x
Half Wave 250x

Burden / Consumption:

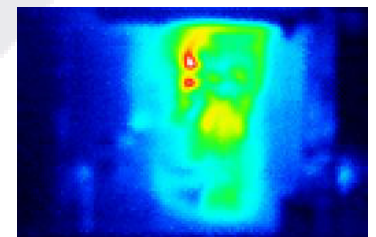
CTs <0.01VA
VTs <0.01VA
Aux. Supply Approx. 10W

VT 1Kv
Relays 10A @ 240Vac
Temp Up to 60degree C cont.

Electrical:

IEC61000-4
IEC60255-21
IEC60255-22

Min Op Time: 30ms
Trip Time Acc: +/- 20ms
Display Acc: +/- 3%
Measurement: True RMS
Weight (app): 1Kg



For over 60 years, we have invested significantly in product design in order to produce equipment capable of operating in demanding and high ambient conditions. This thermal image shows the PSU / Relay pcb performing under high ambient endurance testing during IEC and UL type testing.



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Protective Functionality

Both the MPR3000 and MPC3000 are functionally equivalent to the operation of the 2000.

Enhancements have been made to the menu structuring as well as making use of the graphical nature of the larger LCD. For instance, Digital input status is clearly represented by using a solid or empty fill box, indicating whether an input is energised or volt free.

Motor re-acceleration has been added to the MPC version allowing the motor to automatically restart on loss and restoration of the bus bar voltage.

A Motor Tag, External Fault and RTD inputs can be programmed with changeable text strings to clearly identify, the circuit name and source of input to aid in fault diagnosis. The Fault history is also hugely improved capturing the last 5 trip and last 5 alarm events with values as well as storing the last 64 events with a time and stamp accurate to 1ms.

Terminations & Mechanical

MPR3000 & MPC3000				MPR3000 & MPC3000				MPC3000 ONLY			
LIVE	1	2	NEUTRAL	DI COMM	29	30	DIG_IN 4	DIG_IN 6	57	58	DI COMM
DI COMM	3	4	DIG_IN 1	DIG_IN 5	31	32	DI COMM	DIG_IN 7	59	60	DI COMM
R1 C	5	6	R2 C	R3 C	33	34	R4 C	DIG_IN 8	61	62	DI COMM
R1 N/C	7	8	R2 N/C	R3 N/C	35	36	R4 N/C	DIG_IN 9	63	64	DI COMM
R1 N/O	9	10	R2 N/O	R3 N/O	37	38	R4 N/O	DIG_IN 10	65	66	DI COMM
RS485 SC	11	12	RS485 SC	TEMP 1	39	40	TEMP 1	DIG_IN 11	67	68	DI COMM
V1	13	14	V2	TEMP 1	41	42	TEMP 2	DIG_IN 12	69	70	DI COMM
V3	15	16	neutral	TEMP2	43	44	TEMP 2	DIG_IN 13	71	72	DI COMM
DI COMM	17	18	DIG_IN 2	TEMP3	45	46	TEMP 3	DIG_IN 14	73	74	DI COMM
DI COMM	19	20	DIG_IN 3	TEMP3	47	48	TEMP 4	DIG_IN 15	75	76	DI COMM
I1 HIGH	21	22	I1 LOW	TEMP 4	49	50	TEMP 4	DIG_IN 16 N/O	77	78	DI COMM
I2 HIGH	23	24	I2 LOW	TEMP 5	51	52	TEMP 5	DIG_IN 16 N/C	79	80	DI COMM
I3 HIGH	25	26	I3 LOW	TEMP 5	53	54	SHIELD	DIG_IN 17 N/O	81	82	DI COMM
Io HIGH	27	28	Io LOW	RS485 +	55	56	RS485 -	DIG_IN 17 N/C	83	84	DI COMM

Connections are identical to that of the MPR2000 / MPC2000D meaning no wiring changes are necessary

Each of the rear connection terminals comprise both a 4mm screw outlet and two blade-type connectors.

The switchgear control wiring cable can then be terminated using 1x 4mm (M4) L-shaped ring crimp and/or 2x 4.8mm push-on blade crimps to BS 5057.

Pins 21 through 28 provide self shorting pairs for CT connections upon relay withdrawal.

The front perspex cover offers protection to IP52.

The relay is designed for flush mounting in a standard height 4U case to IEC 60297, the mechanical details are indicated below, the required panel cutout is also shown.

