Motorvision2 [MV2]

Intelligent Motor Protection & Control Relay

Developed from many years experience of intelligent protection and control applications within the high specification offshore / onshore Oil and Gas and Petrochemical sectors.

P&B Engineering's intelligent MV2 has been designed to offer cost effective, versatile, protection and control relaying for low and medium voltage motors forming *the* integral part of any motor control switchgear.

4x	Output Relays with Changeover Contacts
12x	Programmable Digital Inputs
16K	Pixel Graphical LCD
4x	Push Buttons for Menu Driven LCD
2x	Tri Colour LEDs for Indication and Status
1x	Front Mounted RS232 Port
1x	Rear Mounted RS485 Port / Profibus DP 9Way D Type or Optional RJ45 Ethernet
4x	1A or 5A CT Inputs
1x	VT Inputs
	Wide Ranging Auxiliary AC/DC Power Supply
	Optional Dual channel TCS with 2x C/O Output Relays
	Optional 1x RTD/PTC/NTC Input and 4-20mA Output Controller
	Optional 3x ph-n VT inputs
	Optional 6x or 12x Channel RTD Input

Motorvision [MV2]

Specifically designed to provide complete and comprehensive protection and control for low voltage 3-phase motors which are either circuit breaker or contactor controlled.
Multiple starter options provide full control and transfer timing for most DOL, dual wound, reversing, or reduced starting voltage drives. Combined with configurable automatic re-acceleration of the drive on restoration of the auxiliary supply or bus bar voltages.
Flexible programming for the digital inputs and relay outputs allow the MV2 to be installed in either the most basic or most complex starter schemes allowing the switchgear designer to easily integrate the MV2 into almost any type of system.
Optional Trip Circuit Supervision and multiple RTD inputs and 3ph VT connections also allow the MV2 to be employed on MV applications, meaning the same MV2 relay can be applied to motors varying from 0.5A, 380V right up to 1.5kA at 22kV.

One of the main features of the MV2 is the clear and simple navigation of the graphical display, during starting the graphical display will trend the machine energising current and display this for comparison to a previously recorded starting curve.

Integration

As well as comprehensive protection and monitoring the MV2 relay has been designed for integration to control and monitoring systems which allows the protective system to provide remote data telemetry and control. Multiple communication and interface options, including Modbus RTU over RS485, DNP3, Profibus DP, Modbus TCP/IP and IEC61850, allow the MV2 to be connected to virtually any upstream control system.

Time & Date Stamping to 1ms

32 Event Trip and Alarm Histories

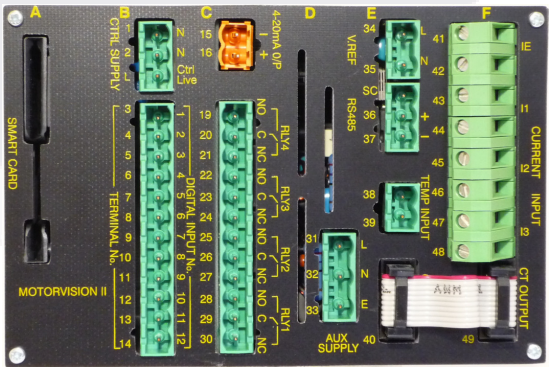
Last 5 Faults with Trip Data

Stats / Historical Information

Fully Programmable Settings

Programmable Digital Inputs

Programmable Relay Outputs

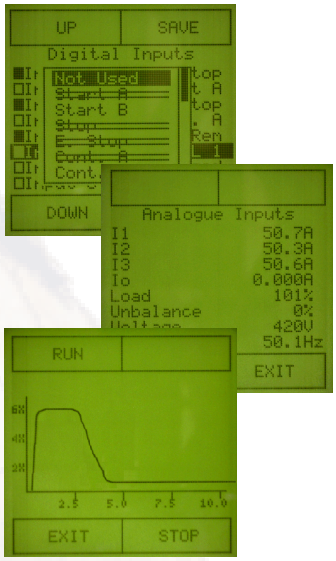


MV2s rear terminals use standard plug in type connections with the exception of the fixed pattern CT connections.

Motorvision2 [MV2]

Intelligent Motor Protection & Control Relay

LCD Display

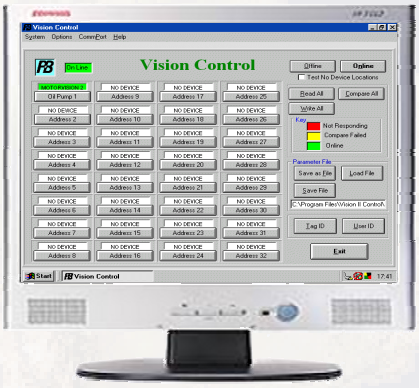


The navigable LCD menu is driven by the four push buttons, this allows access to measured and recorded data as well as providing a programming interface for the relay settings.
The large display allows the menu to be structured in an intuitive way to allow easy of use and understanding of the presented information.

Communication

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, telemetery 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.

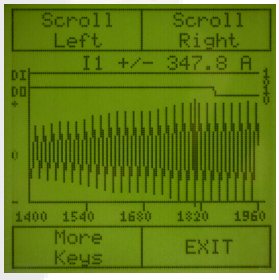


A Smart Card facility can be included within the relay to further aid programming or be used to collect statistical and recorded data. Settings are stored to a card and those settings can then be down-loaded to relays of the same type and function.

A credit card sized slot is provided on the rear of the device to allow smart card access whilst the relay remains functional within the panel.

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

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.
Uniquely, due to the powerful graphical display, waveform traces can also be viewed directly at the relay with zoom and scroll functions without the need for any external equipment.

Environmental / Technical Data

Rated Inputs:

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

Burden / Consumption:

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

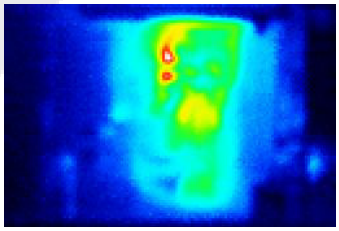
Electrical:

IEC61000-4
IEC60255-21
IEC60255-22

Withstand:

CT	Cont	4x
	10s	30x
	1s	100x
	Half Wave	250x
VT	1Kv	
Relays	10A @ 240Vac	
Temp	Up to 60degree C cont.	

Min Op Time:	30ms
Trip Time Acc:	+/- 20ms
Display Acc:	+/- 3%
Measurement:	True RMS
Weight (app):	1.5Kg



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. The red highlighted area shows the location of the heatsink.

Motorvision2 [MV2]

Intelligent Motor Protection & Control Relay

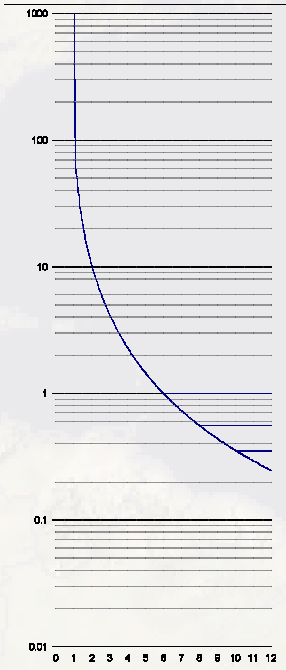
Protection Functionality

			Available Action						Available Reset								
	#	Selectable Option	Trip	Alarm	Inhibit	Stop	Test	Option	Auto	Panel	Serial	Remote	Indicators 1-5	Change Name			AMV2 ONLY
	!	Not Selectable															RTDMV2 ONLY
																	MV2, AMV2 & RTDMV2
ANSI No.		Protective Function													Variable	Range	Step
48/14		Maximum Start Time	#	#					#	#	#	#	#		Trip Time:	1-250s	1s
															Hot/Cold Ratio:	20-80%	1%
26/49		Thermal Model	!	#					#	#	#	#	#		Cool Time Factor:	25-2000%	5%
															t6x:	0.1-120s	0.1s
															Trip Level: (% of ARC)	50-95%	5%
37		Undercurrent	#	#					#	#	#	#	#		Trip Time:	1-60s	1s
															U/C Reset Delay:	0-1200s	10s
51		Load Increase	#	#					#	#	#	#	#		Trip Level: (% of ARC)	105-150%	5%
															Trip Time:	1-60s	1s
50/51		Overcurrent	#	#					#	#	#	#	#		Trip Level: (% of FLC)	150-750%	5%
															Trip Time:	0.1-10.0s	0.1s
81H		Overfrequency	#	#					#	#	#	#	#		Trip Level:	40-70Hz	1Hz
															Trip Time:	1-60s	1s
81L		Underfrequency	#	#					#	#	#	#	#		Trip Level:	40-70Hz	1Hz
															Trip Time:	1-60s	1s
46SP		Single Phase	!	#					#	#	#	#	#		Trip Time: [fixed]	<100ms	
47		Phase Rotation	#	#					#	#	#	#	#		Direction:	ABC/ACB	
46		Unbalance	#	#					#	#	#	#	#		Trip Level: (% of FLC)	10-40%	5%
															Trip Time:	1-60s	1s
27		Undervoltage	#	#					#	#	#	#	#		Trip Level: (% of Vn)	50-95%	5%
															Trip Time:	0.1-60s	0.1s
27/86		U/V Lockout		#	!				#	#	#	#	#		Lockout Level: (% of Vn)	50-95%	5%
50/51n		Earth Fault	#	#					#	#	#	#	#		Trip Level:	1[10]-40%	0.1%
	or	[Internal Residual E/F]													Trip Time:	0.1[0.2]-5.0s	0.1s
															Resistance Type:	RTD/PTC/NTC	
															RTD Compensation:	0-250^0	1^0
38/49		Over Temperature	#	#					#	#	#	#	#		RTD Trip Level:	0-250^0	1^0
															PTC/NTC Trip:	1000-30Kohm	100
															Trip Time:	10-250s	1s
66															Starts Per Period	1-60	1
															Start Inhibit Time:	1m-120m	1m
		Too Many Starts			!				!				#		Start Period:	1m-60m	1m
															Start Inhibit Type	IT / RSP / RSP+IT	
59		Overvoltage	#	#					#	#	#	#	#		Trip Level: (% of Vn)	105-120%	5%
															Trip Time:	1-60s	1s
86		Backspin			!								!		Backspin Time:	1-300s	1s
55		Pow er Factor	#	#					#	#	#	#	#		Trip Level:	0.20-0.95	0.05
															Trip Time:	1-60s	1s
36		External 1 (to 10)	#	#	#	#	#		#	#	#	#	#	#	Fault Polarity:	ON / OFF	
															Trip Time:	0.4-60s	0.1s
50		Short Circuit	!							#	#	#	#		Trip Level [fixed]:	10x In	
															Trip Time: [fixed]	<100ms	
48		Contactor Fault	#	#					#	#	#	#	#		Trip Time:	1-200s	1s
86		Emergency Stop	!	#						#	#	#	#		Trip Time [fixed]:	<100ms	
		Serial Timeout	#	#					#	#	#	#	#		Timeout In:	1-120s	1s
		Internal Error	#	#					#	#	#	#	#				
74		Serial Inhibit			#	#					!		#				
38/49		RTD Over Temp 1 (to 12)	#	#	#				#	#	#	#	#	#	Trip Level:	0-490^0	1^0
															Trip Time:	5-250s	1s

Motorvision2 [MV2]

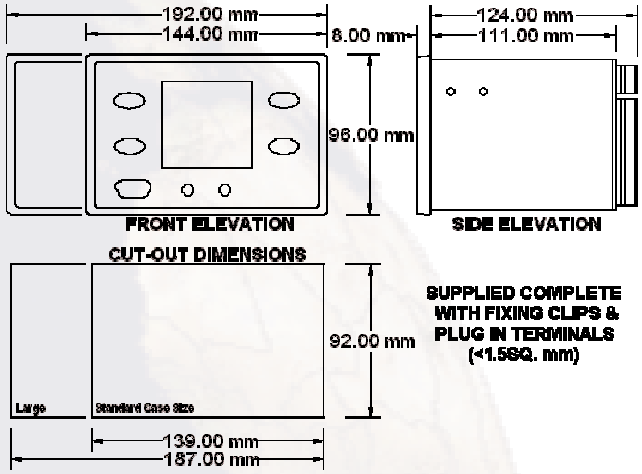
Intelligent Motor Protection & Control Relay

Thermal Protection



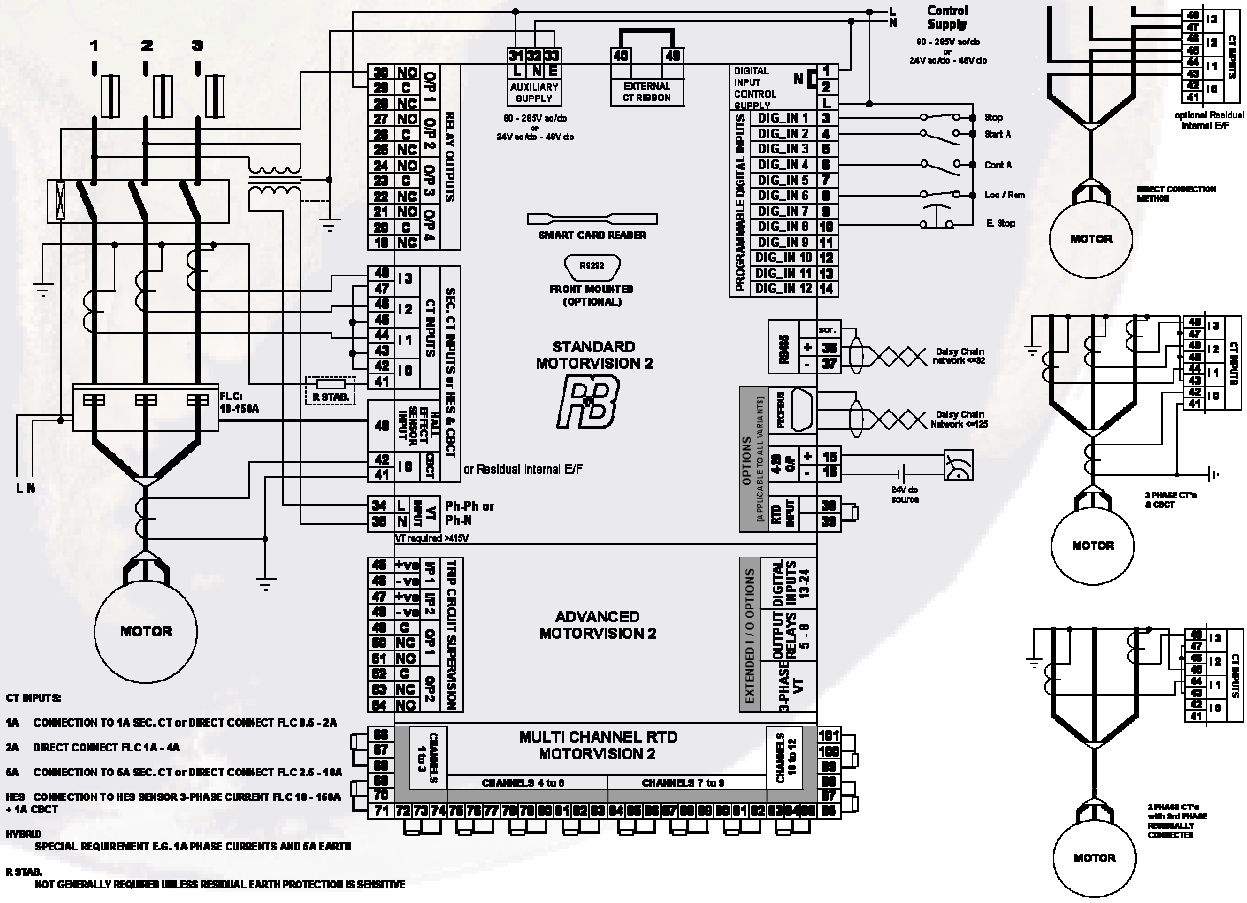
The primary function of the MV2 is to provide thermal protection for ac motors. The historic electromechanical, bimettalic operation is accurately modelled within software. The curve provides for a DT cut off to allow for discrimination. The curve extends to 12x FLC and can be set to a DT level at 6, 8, 10 or 12x FLC. The thermal curve effectively means a higher overload will result in a faster trip time. In order to set the correct overload curve for the motor a t6x value is required. The t6x value is the figure calculated by the safe stall times of the motor. T6x can be set from 0.5 to 120 in steps of 0.1.

Installation



The MV2 relay is supplied in a DIN standard case suitable for flush mounting to a type 1 enclosure.

Typical Schematics



a P&B Engineering, Belle Vue Works, Manchester, M12 5NG, United Kingdom
t +44 (0)161 230 6363 f +44 (0)161 230 6464 w www.pbeng.co.uk