Opal Pro MS6 SERIES

DeviceNet Interface Users Manual

Revision 1.01

FOR YOUR SAFETY

Only qualified personnel should install this equipment, after first reading and understanding all the information in this manual. All instructions should be strictly adhered to. The user should consult SAF Drives or a SAF OPAL Starters supplier for clarification of the contents of this manual should any doubt or questions arise.

The installation of this equipment must be conducted in accordance with all national, regional and local electrical codes.

All drawings and technical representations included in this manual are for typical installations and should not in any way be considered for specific applications or modifications. Consult SAF OPAL Starters for supplemental instructions.

SAF Drives Inc. accepts no liability for any consequences resulting from inappropriate, negligent or incorrect installation, application or adjustment of this equipment.

The contents of this manual are believed to be correct at the time of printing. In following with our commitment to the ongoing development and improvement of our products SAF OPAL Starters reserves the right to change the specification of this product and/or the content of this instruction manual without notice.

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Opal Pro to DeviceNet

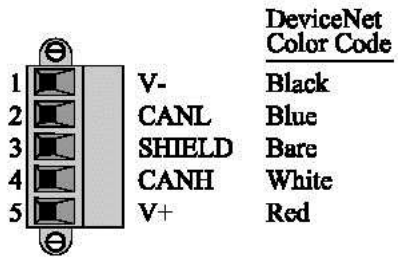
Introduction

The Opal Pro can be monitored and controlled over a DeviceNet communication network. The Opal Pro connects to the DeviceNet network through and optional DeviceNet card that is mounted on the main Opal Pro control card (CA530). Access is gained to the DeviceNet card via the communication opening on the right side of the Opal Pro. The Opal Pro is a DeviceNet Slave and responds to a DeviceNet Masters polled requests.

Hardware

Connection is made through an optically isolated CAN interface. The connector is a DeviceNet compatible 5-pin screw terminal bus connector. The hardware is compatible with the CAN specification 2.0 part A.

Connections



V+ and V- is the network power connection: 11 – 24 VDC 50mA

Jumper Settings

Jumpers BA1 and BA2 select the board address for the interface between the Opal Pro control card and the DeviceNet interface card. The default setting for these jumpers is Address 3 and **should not be changed**.

BA1	**BA2**	**Board Address**
ON	ON	Address 3 (default as shipped)
ON	OFF	Address 2
OFF	ON	Address 1
OFF	OFF	Address 0

LED Indicators

Two bi-colour (red/green) LED indicators are mounted beside the network connector. The upper LED (the one mounted furthest away from the DeviceNet interface PCB) indicates the DeviceNet interface card status.

LED State	**DeviceNet Interface Card Status**
OFF	No power
Flashing Red	Recoverable configuration fault (card is not configured, contact SAF Drives for support)
Solid Red	Hardware Error (contact SAF Drives for support)
Flashing Green	No errors client interface is not open (check software firmware version of Opal Pro)
Solid Green	No errors client interface is open (normal operation)
Amber (Red/Green)	Configuration Mode (card is not configured, contact SAF Drives for support)

The lower LED indicator (the one mounted closest to the DeviceNet interface PCB) indicates the DeviceNet Network status.

LED State	**DeviceNet Network Status**
OFF	Network interface offline, No network power
Flashing Red	I/O connection in timed-out state or other Recoverable fault
Flashing Green	Device in online but has no connections
Solid Red	Unrecoverable fault
Solid Green	Online with established connections
Amber (Red/Green)	Device is in Communication Faulted state and responding to an Identify Communication Faulted Request

Opal Pro Parameter Settings

The parameters in the Opal Pro used to configure the DeviceNet interface card (group 14) are only accessible if a DeviceNet interface card is installed.

The parameter settings are as follows:

Opal Pro Parameter	**Setting**	**Description**
2.02 Comm Module	DeviceNet	Type of interface card installed (read only)
10.01 Start/Stop	Comm Module	This allows the Opal Pro to be started and stopped over the communication link
10.04 Iref Source	Comm Module	If this is set to Comm Module the Opal pro will follow the Current refernce from the communication link. If there is no reference being sent on the communication link this should be set to “Internal”
10.05 Phase Angle Source	Comm Module	If this is set to Comm Module the Opal pro will follow the Phase Angle reference from the communication link. If there is no reference being sent on the communication link this should be set to “Internal”
14.03 Mac ID	0 – 63	This is the Mac ID of the slave Opal Pro
14.04 DeviceNet Baud Rate	125K, 250K, 500K	This is the baud rate setting for the DeviceNet Network
15.04 Comm Fault	Enable Disable	Enable – Opal Pro trips out on a communication fault Disable – Nothing happens on a communication fault
15.05 Comm Fault Time	0.1 to 5.0 secs	This is the time setting that the Opal Pro uses to detect a communication fault. Bit 15 of the command word must change state twice with in the time set in this parameter.

If parameters in group 14 are modified the changes do not take effect until the control power for the Opal Pro is turned off and then back on again.

I/O Configuration

The Opal Pro does not currently implement the official DeviceNet Softstart device profile. The Opal Pro supports 4 polled input words (8 bytes) and 14 polled output words (28 bytes). Their description is as follows:

Input Words (Polled)	**Name**	**Description**
Word 1	Command	Bit 0 – Run Command
		Bit 1 – Jog Command
		Bit 2 – Reverse Command
		Bit 3 – Reset Command
		Bit 4 – DCI/Soft Stop Enable
		Bit 5 – Reserved
		Bit 6 – Reserved
		Bit 7 – Reserved
		Bit 8 – Reserved
		Bit 9 – Reserved
		Bit 10 – Reserved
		Bit 11 – Reserved
		Bit 12 – Reserved
		Bit 13 – Reserved
		Bit 14 – Reserved
		Bit 15 – Watch Dog bit (this bit must change at least twice in the time set by parameter 15.05)
Word 2	Current Reference	0 –1000, 833 = 500% of Motor Current set in parameter 13.01
Word 3	Phase Angle Reference	0 – (0.5 * Line Freq Cycle time in usec) ie: 60 Hz 0 – 8333
Word 4	Reserved	

Output Words (Polled)	Name	Description
Word 1	Status	Bit 0 – Ready to Run (drive is enable and has 3 phase power)
		Bit 1 –Running (start is regulating)
		Bit 2 – Full On (starter is phased fully on)
		Bit 3 – Up to Speed (started is phased fully on and the current is below 105% of nameplate current as set in 13.01)
		Bit 4 – Reverse
		Bit 5 – Jogging
		Bit 6 – DC Injecting
		Bit 7 – Faulted
		Bit 8 – IOC Fault
		Bit 9 – MOL Fault
		Bit 10 – Phase Loss Fault
		Bit 11 – Shear Pin Fault
		Bit 12 – Shorted SCR Fault
		Bit 13 – Heat Sink OT Fault
		Bit 14 – Reserved
		Bit 15 – Watch Dog Bit
Word 2	Current Feedback	833 = 500% of motor name plate current as set in 13.01
Word 3	Phase Angle Actual	Amount of time phased on in microseconds
Word 4	Current	Current feedback in Amps
Word 5	L1 to L2 Voltage	Line 1 to Line 2 Voltage in Volts
Word 6	L1 to L3 Voltage	Line 1 to Line 3 Voltage in Volts
Word 7	L2 to L3 Voltage	Line 2 to Line 3 Voltage in Volts
Word 8	DI Status	Digital input status
		Bit 0 – Start
		Bit 1 – Stop
		Bit 2 – Jog
		Bit 3 – Reverse
		Bit 4 – Reset
Word 9	Analog Input	Analog input value in Volts X 100
Word 10	Relay Status	Status of the Relay Outputs
		Bit 0 – Running
		Bit 1 – By-Pass
		Bit 2 – Shorted SCR
		Bit 3 – Reverse
		Bit 4 – Faulted
Word 11	Analog Output	Analog Output value in Volts X 100

Word 12	Stack Size	Opal Pro Stack Size in Amps
Word 13	Comm Module Type	0 – None 2 – DeviceNet
Word 14	Firmware Version	Opal Pro Firmware Version X 100

NOTE: The Opal Pro must have firmware version 1.63 or higher.

The EDS file (electronic data sheet) may be obtained from our web site at www.opalstarters.com