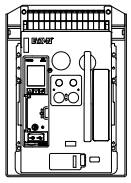
Instruction Leaflet **IL0131092EN**

Supersedes July 2016
Effective January 2019

Power Defense – ICCB

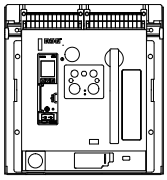
PCAM instructions for profibus dp communications adapter module

Instructions apply to:



UL489 : **PD-NF**

IEC : **PD-NF, IZMX16**



UL489 : **PD-RF**

IEC : **PD-RF, IZMX40**

⚠ WARNING

(1) ONLY QUALIFIED ELECTRICAL PERSONNEL SHOULD BE PERMITTED TO WORK ON THE EQUIPMENT.
(2) ALWAYS DE-ENERGIZE PRIMARY AND SECONDARY CIRCUITS IF A CIRCUIT BREAKER CANNOT BE REMOVED TO A SAFE WORK LOCATION.
(3) DRAWOUT CIRCUIT BREAKERS SHOULD BE LEVERED (RACKED) OUT TO THE DISCONNECT POSITION.
(4) ALL CIRCUIT BREAKERS SHOULD BE SWITCHED TO THE OFF POSITION AND MECHANISM SPRINGS DISCHARGED.
FAILURE TO FOLLOW THESE STEPS FOR ALL PROCEDURES DESCRIBED IN THIS INSTRUCTION LEAFLET COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

⚠ WARNING

THE INSTRUCTIONS CONTAINED IN THIS IL AND ON PRODUCT LABELS HAVE TO BE FOLLOWED. OBSERVE THE FIVE SAFETY RULES:
– DISCONNECTING
– ENSURE THAT DEVICES CANNOT BE ACCIDENTALLY RESTARTED
– VERIFY ISOLATION FROM THE SUPPLY
– EARTHING AND SHORT-CIRCUITING
– COVERING OR PROVIDING BARRIERS TO ADJACENT LIVE PARTS
DISCONNECT THE EQUIPMENT FROM THE SUPPLY. USE ONLY AUTHORIZED SPARE PARTS IN THE REPAIR OF THE EQUIPMENT. THE SPECIFIED MAINTENANCE INTERVALS AS WELL AS THE INSTRUCTIONS FOR REPAIR AND EXCHANGE MUST BE STRICTLY ADHERED TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE SWITCHBOARD.

Power Defense™

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Section 1: General information

The PROFIBUS® DP Communications Adapter Module (PCAM) (Figure 1) is an accessory that will operate as a communicating device in conjunction with a compatible trip unit/breaker in a master communications network (Figure 2).

The PCAM communicates to a PROFIBUS DP network master using the PROFIBUS-DP-V0 protocol.

Figure 1. PROFIBUS DP communications adapter module (PCAM).

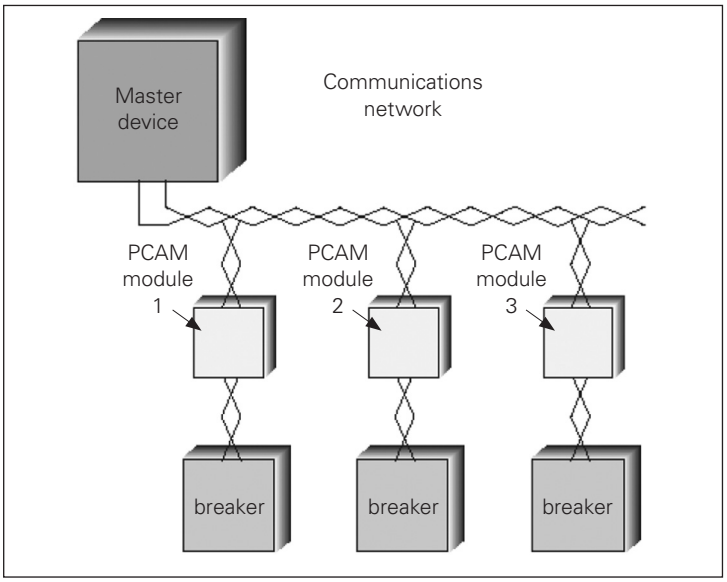


Figure 2. PROFIBUS DP communications adapter modules in a PROFIBUS DP network.

The PROFIBUS DP communications adapter module is a slave device and, as such, requires a master device for control command initiation. Each PROFIBUS DP communications adapter module provides:

- Circuit breaker open/close/reset control
- Flashing Status LED indicating module has power
- PROFIBUS DP communication enable/disable selection jumper for remote open/close control
- DIN rail mounting (11 mm H, 28 mm W DIN rail minimum requirement)
- Input power for module from 24 Vdc

The PROFIBUS DP communications adapter module is designed to be installed, operated, and maintained by adequately trained people. These instructions do not cover all details or variations of the equipment for its storage, delivery, installation, checkout, safe operation, or maintenance.

If you have any questions or need additional information or instructions, please contact your local Eaton representative or visit www.eaton.com.

Section 2: Installation instructions for the remote mount CAM module adapter

Note: Many illustrations use the NF Frame circuit breaker for illustrative purposes only. The RF Frame circuit breaker is handled in a similar fashion.

The following steps outline the installation procedure for a PROFIBUS DP communications adapter module on a separate DIN rail for fixed and drawout configurations. Please contact Eaton for additional information.

Table 1. Kit contents.

Qty.	Item
1	Adapter harness – CAM module to breaker secondary
1	Ferrule 2-18 AWG (Weidmuller PN 9004310000)
1	Installation instructions

This kit does not include the DIN rail for mounting the CAM module.

This kit provides an additional cable adapter for connection from the communications adapter module (CAM) to the circuit breaker when the CAM needs to be mounted remotely such as with a fixed mount circuit breaker (see Figure 3). The adapter consists of a 1 meter (3 ft.) length of cable that connects between the CAM module and the breaker secondary. The CAM module should be mounted on a length of standard grounded DIN rail.

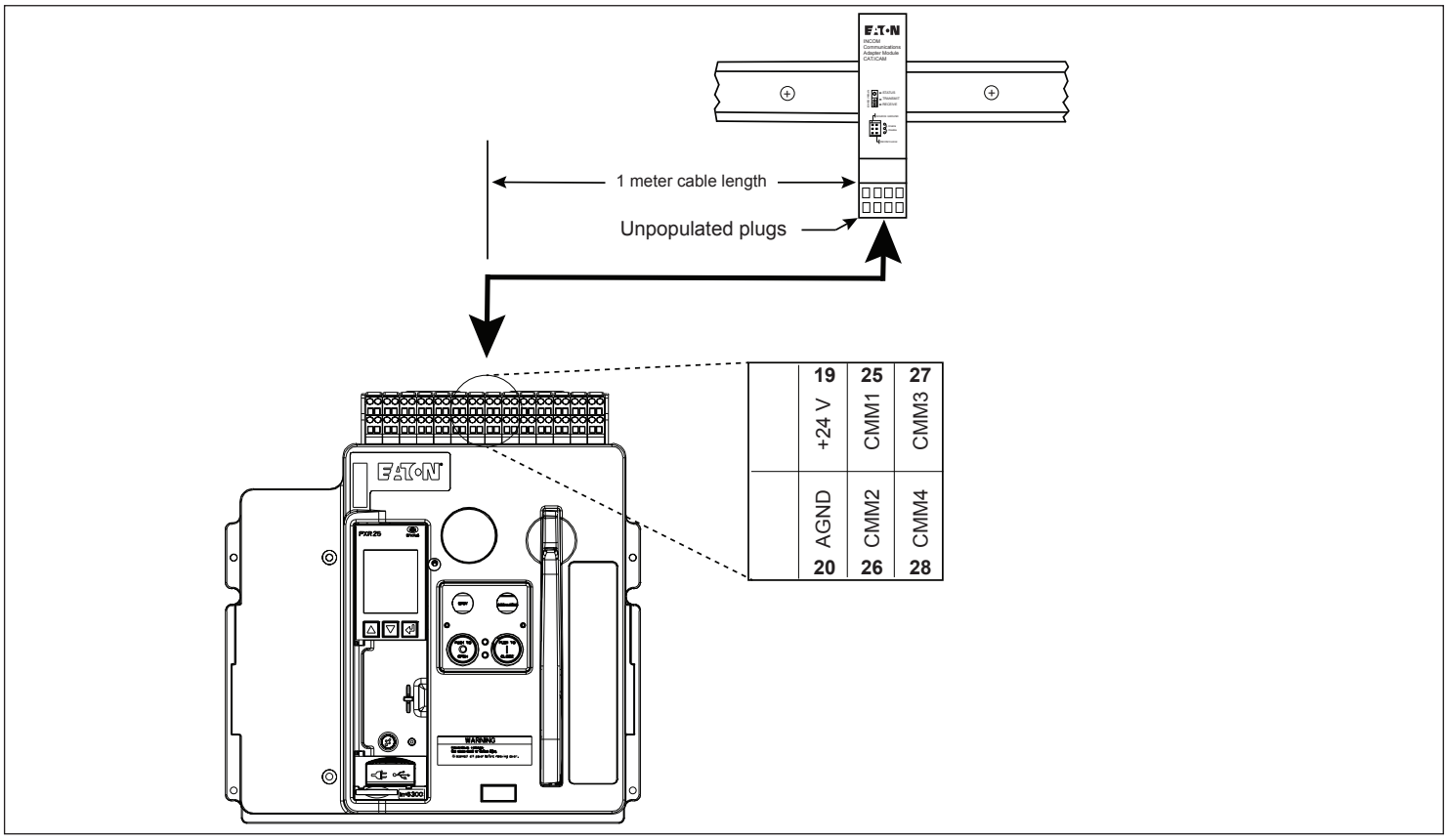


Figure 3. Connection of adapter cable to the circuit breaker.

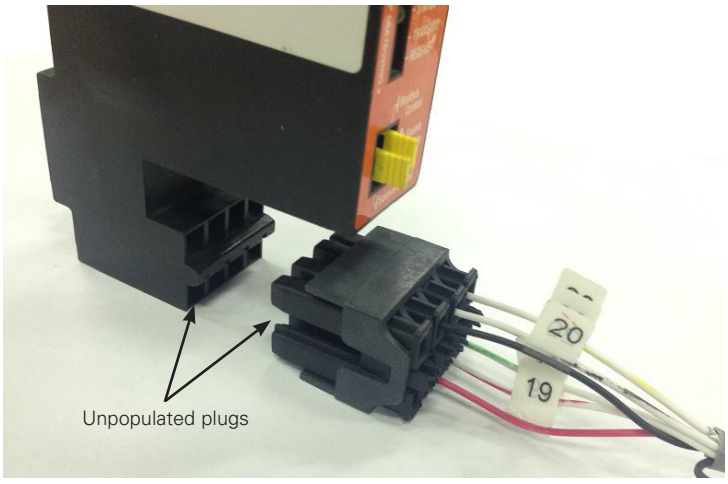


Figure 4. Connection to the CAM module.

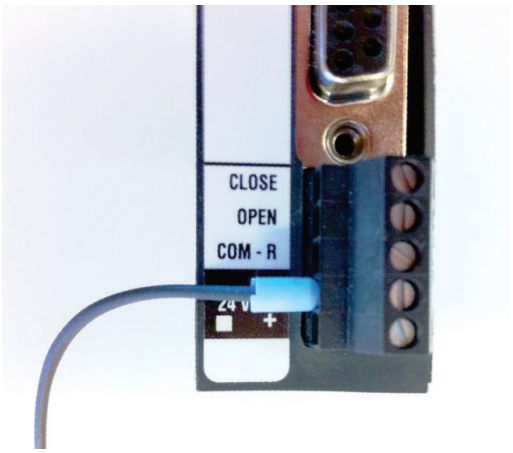


Figure 5. Connection to the CAM module.

The numbered flags on each wire of the cable directly correspond with the breaker secondary terminal designators. When connecting the adapter to the CAM module, ensure the unpopulated plugs are positioned on the left hand side as indicated in Figure 4. Note that the CAM module connector is keyed to fit in only one orientation.

The drain wire may be connected to the SHIELD terminal on the MCAM or the ICAM. Or it may be connected to the grounded DIN rail. If a PCAM or ECAM module is used use the 2-18 AWG Ferrule provided to connect the cable drain wire for a proper connection to the power supply ground terminal as shown in Figure 5.

Section 3: PROFIBUS DP RS-485 network wiring

Reference material pertaining to PROFIBUS can be obtained from the http://PROFIBUS.com web site. Refer to the PROFIBUS DP standard for transmission using copper cables (RS-485). A 9-pin D-SUB connector interface is provided.

Section 4: PROFIBUS DP communications module connections

⚠ WARNING

ALL APPLICABLE SAFETY CODES, SAFETY STANDARDS, AND SAFETY REGULATIONS MUST BE STRICTLY ADHERED TO WHEN INSTALLING, OPERATING, OR MAINTAINING THIS EQUIPMENT. FAILURE TO COMPLY COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

For installation specifics, refer to Figures 4 and 5 on page 3 for wiring diagrams, as well as pin-out Table 2 (Power connections) and Table 3 (PROFIBUS DP connections).

Table 2. Power connector pin-outs[1].

Pin number	Input signal
1	24 Vdc +
2	24 Vdc –
3	Control signal common
4	Control open signal
5	Control close signal

1 Module power uses a 5-pin input connector. Power requirement is 24 Vdc, 10 watts.

PROFIBUS DP RS-485 connector

This DB9 connector provides the interface to the PROFIBUS DP RS-485 network. The polarity of the RxD/TxD data lines is "critically" important. Refer to Table 3.

Table 3. PROFIBUS DP RS-485 connector pin-outs.

Pin number	Input/output signal
1	Shield[1]
2	M24 (ground for +24 V output)[1]
3	RxD/TxD-P (B-dataline)
4	CNTR-P/RTS
5	DGND (data-ground)
6	VP (plus for 5 V supply)
7	P24 (plus for 24 V output)[1]
8	RxD/TxD-N (A-dataline)
9	CNTR-N[1]

1 PROFIBUS signals that are not connected on the PCAM.

Section 5: Jumpers and indicator LEDs

Refer to Figure 6 to become familiar with specific jumper and LED locations on the PROFIBUS DP communications adapter module.

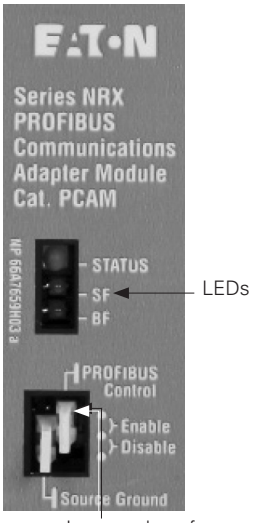


Figure 6. Communications adapter module (front view, close up).

Microcontroller LED (status)

This indicator will be flashing green whenever the module is powered up and when the microprocessor is executing instructions. When the PROFIBUS DP communications adapter module is connected to a PXR, this LED will alternately flash red and green to signal a learning process between both units. This automatic process will take approximately 15 seconds and occurs only once during the initial startup. The LED will also flash red if the module is not connected to or unable to communicate with a PXR trip unit.

PROFIBUS SYSFAULT LED (red)

The LED will be illuminated as described in Table 4.

PROFIBUS BUSFAULT LED (red)

The LED will be illuminated as described in Table 4.

Table 4. PROFIBUS DP LED states.

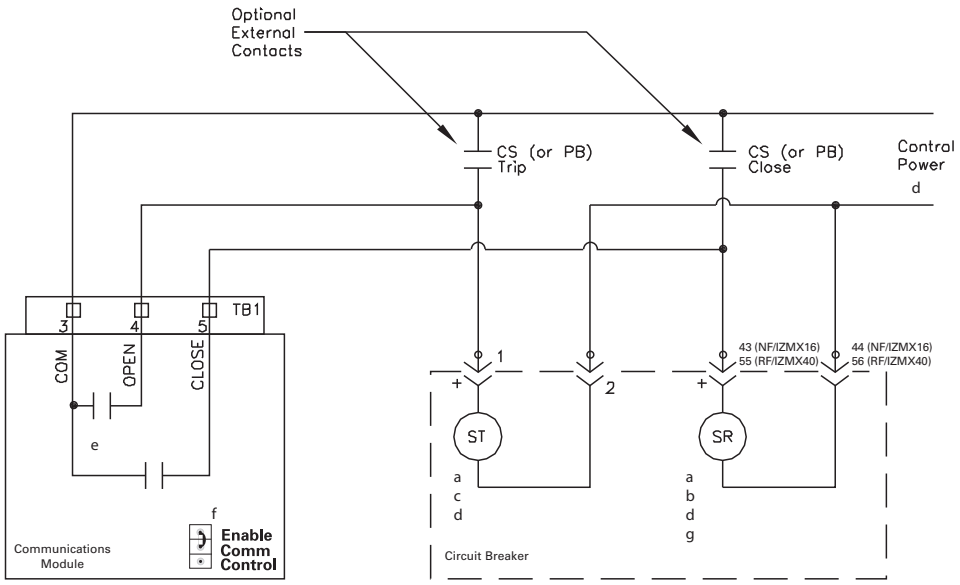
SF	BF	PROFIBUS DP state
Off	Off	Everything OK
Off	On	No communications
Off	Blinking	Communications, but not in data exchange
On	On	Configuration not OK

PROFIBUS DP control jumper

This jumper provides the user with a means of enabling or disabling remote communication control commands to the PXR. With jumper placed in the ENABLE position, remote Open and Close breaker commands can be acted upon. With the jumper in the DISABLE position, these commands will not be accepted.

Source/residual ground selection jumper

Consult the series PXR trip unit instructions (MN013003EN - Operating manual for PXR 20/25 trip units) for further information on ground sensing. This jumper is not applicable and does not function for PXR style trip units.



① Spring release and shunt trip wiring as shown for optional communication close or open capability.
② Choose spring release coil voltage rating as desired if communications is required.
③ Choose shunt trip rating to be the same as spring release rating if communication is required.
④ Control power rating must match ST and SR coil rating.
⑤ Close duration is two seconds on communication activation.
⑥ Communication control jumper must be in the enable position for communications opening or closing.

Figure 7. Communications control (SR and ST wiring).

Section 6: Viewing/setting PROFIBUS DP address

The PXR 20/25 trip unit is used as the means to display and modify the programmed address setting of the PCAM module. All modules are shipped with the SSA (set slave address) of 126. The settable address range is 001–125.

A trip unit containing a full display, such as the PXR 20/25, will provide the PCAM settings in menu form.

To set or view PCAM settings on a PXR 20/25, the following sequence is used.

To set or view the address, go to the "Settings - Communications - Profibus Cam" menu on the PXR trip unit.

Table 5. PCAM communications setting range.

	Setting number	Allowable range
Communication address	SP00	001–125

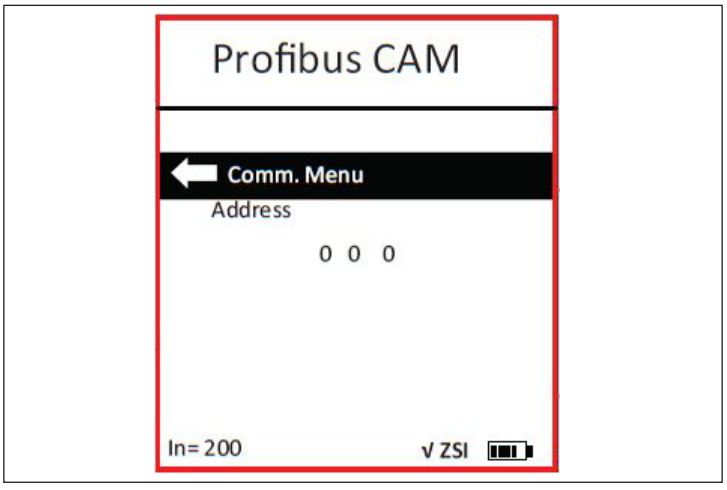


Figure 8. PXR trip unit PCAM address.

Section 7: PROFIBUS DP-V0 profiles

The PCAM supports the PROFIBUS DP profile for low voltage switchgear devices (LVSG): Circuit Breaker Device Classification. This classification provides cyclic data exchange structures for one command (outputs from the PROFIBUS master to the PCAM slave device) format (Format 0) and four monitoring (inputs from the PCAM slave device to the PROFIBUS master) formats (Format 0–Format 3). The PCAM also supports an added monitoring format (Format 4), similar to Format 3, except the active energy value is provided with a higher resolution. The configuration data accepted by the PCAM (and described at the end of the GSD file) is defined in Table 6.

Table 6. CFG data formats.

Profile type	CFG data	Command format	Monitoring format
1	0 x 31	0	0
2	0 x 31, 0 x D3	0	1
3	0 x 31, 0 x D7	0	2
4	0 x 31, 0 x DD	0	3
5	0 x 31, 0 x DE	0	4
6	0 x 31, 0 x 00	0	0

Cyclic data exchange command structure format

Command structure Format 0 for cyclic data exchange from the PROFIBUS master supported by the PCAM is described in Table 7.

The bits are defined as bit 0 is bit 0 of byte 0; bit 8 is bit 0 of byte 1.

Cyclic data exchange monitoring structure formats

Monitoring structure Formats 0–4 for cyclic data exchange returned from the PCAM to the PROFIBUS master are described in Table 8 through Table 12, respectively.

The state information bytes are required in all monitoring formats. The bits are defined as bit 0 is bit 0 of state byte 0; bit 8 is bit 0 of state byte 1.

The definitions are deciphered from the Primary/Secondary/Cause-Of-Status information reported from the trip unit (see Tables 14, 15, and 16, respectively).

The multi-byte measurement values of Formats 1–4 are transmitted most significant byte first, as required by the PROFIBUS protocol.

Table 7. Cyclic data exchange command Format 0.

Byte	Bit(s)	Description	Implementation
0	1–0	Circuit breaker: 00 = no change 01 = switch OFF 10 = switch ON 11 = no change	 Open breaker (if remote enabled, see Section 5) Close breaker (if remote enabled, see Section 5)
	2	Clear last trip	"Reset Trip" issued to trip unit
	3	Output 0	Not implemented
	4	Output 1	Not implemented
	5	Output 2	Not implemented
	6	Output 3	Not implemented
	7	Output 4	Not implemented
1	9–8	Test mode: 00 = no test 01 = w/o release 10 = with release 11 = with warning	 Not implemented Not implemented Not implemented
	10	Delete history memory	Not implemented
	11	Reset min./max. memory	Not implemented
	12	Reset temperature min./max. memory	Not implemented
	13	Output 5	Not implemented
	14	Reset maintenance information	Not implemented
	15	Clock synchronization	Not implemented

Table 8. Cyclic data exchange monitoring Format 0.

Byte	Bit(s)	Description	Implementation
0	1–0	Position of circuit breaker: 00 = disconnected 01 = operational 10 = test 11 = not present	 No communications with trip unit Communications with trip unit
	3–2	State of circuit breaker: 00 = Init 01 = OFF 10 = ON 11 = Tripped	 00 = communications with trip unit not yet established 01 = Primary status: open 10 = Primary status: closed, alarm, pickup 11 = Primary status: tripped
	4	Ready to switch on	1 = (not implemented)
	5	Undervoltage release	1 = Primary status: tripped, cause: 12
	6	Spring loaded	1 = (not implemented)
	7	Overload warning	1 = Primary status: alarm, cause: 61, OR Primary status: pickup
1	8	Setpoint activated	1 = Primary status: alarm, cause: 11, 12, 15, 16, 17, 18, 26, 27
	9	Warning	1 = Primary status: alarm, cause: all except 61
	10	Write protection activated	1 if Digitrip 1150 trip unit AND remote enabled, see Section 5
	11	Input 0	0 = (not implemented)
	14–12	Release reason: 000 = no release 001 = L(ongtime) release 010 = I(nstantaneous) release 011 = S(horttime) release 100 = earth fault 101 = extended protection 110 = over-current in N-wire 111 = no device information	 000 = Primary status: NOT tripped 001 = Primary status: tripped, causes: 61 (with I_n < all other currents) 010 = Primary status: tripped, causes: 3, 66, 76 011 = Primary status: tripped, causes: 62 100 = Primary status: tripped, causes: 84, 85 101 = Primary status: tripped, causes: all other remaining 110 = Primary status: tripped, causes: 80 111 = communications with trip unit not yet established
	15	Load rejection	1 = Primary status: alarm, cause: 26

Table 9. Cyclic data exchange monitoring Format 1.

Byte(s)	Data type	Description	Resolution	PXR 20	PXR 25
0	Unsigned8	State 0 (byte 0 of monitoring Format 0, **Table 7**)		X	X
1	Unsigned8	State 1 (byte 1 of monitoring Format 0, **Table 7**)		X	X
3–2	Unsigned16	I_{L1} (Phase A current)	Amps	X	X
5–4	Unsigned16	I_{L2} (Phase B current)	Amps	X	X
7–6	Unsigned16	I_{L3} (Phase C current)	Amps	X	X
9–8	Unsigned16	$I_{L\,max}$ (maximum value of I_{L1}, I_{L2}, I_{L3})	Amps	X	X

Table 10. Cyclic data exchange monitoring Format 2,

Byte(s)	Data Type	Description	Resolution	PXR 20	PXR 25
0	Unsigned8	State 0 (byte 0 of monitoring Format 0, Table 8)		X	X
1	Unsigned8	State 1 (byte 1 of monitoring Format 0, Table 8)		X	X
3–2	Unsigned16	I_{L1} (Phase A current)	Amps	X	X
5–4	Unsigned16	I_{L2} (Phase B current)	Amps	X	X
7–6	Unsigned16	I_{L3} (Phase C current)	Amps	X	X
9–8	Unsigned16	$I_{L\,max}$ (maximum value of I_{L1}, I_{L2}, I_{L3})	Amps	X	X
11–10	Unsigned16	I_N (neutral current)	Amps	X	X
13–12	Unsigned16	$V_{LL\,avg}$ (average line-to-line voltage)	Volts		X
15–14	Integer16	cos phi_{avg} (average of apparent power factor)	0–1000		X
17–16	Unsigned16	Energy	MWh		X

Table 11. Cyclic data exchange monitoring Format 3.

Byte(s)	Data Type	Description	Resolution	PXR 20	PXR 25
0	Unsigned8	State 0 (byte 0 of monitoring Format 0, Table 8)		X	X
1	Unsigned8	State 1 (byte 1 of monitoring Format 0, Table 8)		X	X
3–2	Unsigned16	I_{L1} (Phase A current)	Amps	X	X
5–4	Unsigned16	I_{L2} (Phase B current)	Amps	X	X
7–6	Unsigned16	I_{L3} (Phase C current)	Amps	X	X
9–8	Unsigned16	$I_{L\,max}$ (maximum value of I_{L1}, I_{L2}, I_{L3})	Amps	X	X
11–10	Unsigned16	I_N (neutral current)	Amps	X	X
13–12	Unsigned16	$V_{L1\text{-}L2}$ (V_{AB} line-to-line voltage)	Volts		X
15–14	Unsigned16	$V_{L2\text{-}L3}$ (V_{BC} line-to-line voltage)	Volts		X
17–16	Unsigned16	$V_{L3\text{-}L1}$ (V_{CA} line-to-line voltage)	Volts		X
19–18	Unsigned16	$V_{L1\text{-}N}$ (V_{AN} line-to-neutral voltage)	Volts		X
21–20	Unsigned16	$V_{L2\text{-}N}$ (V_{BN} line-to-neutral voltage)	Volts		X
23–22	Unsigned16	$V_{L3\text{-}N}$ (V_{CN} line-to-neutral voltage)	Volts		X
25–24	Integer16	cos phi_{avg} (average of apparent power factor)	0–1000		X
27–26	Unsigned16	Energy	MWh		X
29–28	Unsigned16	S_{total} (total apparent power)	kVA		X

Table 12. Cyclic data exchange monitoring Format 4.

Byte(s)	Data type	Description	Resolution	PXR 20	PXR 25
0	Unsigned8	State 0 (byte 0 of monitoring Format 0, Table 8)		X	X
1	Unsigned8	State 1 (byte 1 of monitoring Format 0, Table 8)		X	X
3–2	Unsigned16	I_{L1} (Phase A current)	Amps	X	X
5–4	Unsigned16	I_{L2} (Phase B current)	Amps	X	X
7–6	Unsigned16	I_{L3} (Phase C current)	Amps	X	X
9–8	Unsigned16	$I_{L\,max}$ (maximum value of I_{L1}, I_{L2}, I_{L3})	Amps	X	X
11–10	Unsigned16	I_N (neutral current)	Amps	X	X
13–12	Unsigned16	$V_{L1\text{-}L2}$ (V_{AB} line-to-line voltage)	Volts		X
15–14	Unsigned16	$V_{L2\text{-}L3}$ (V_{BC} line-to-line voltage)	Volts		X
17–16	Unsigned16	$V_{L3\text{-}L1}$ (V_{CA} line-to-line voltage)	Volts		X
19–18	Unsigned16	$V_{L1\text{-}N}$ (V_{AN} line-to-neutral voltage)	Volts		X
21–20	Unsigned16	$V_{L2\text{-}N}$ (V_{BN} line-to-neutral voltage)	Volts		X
23–22	Unsigned16	$V_{L3\text{-}N}$ (V_{CN} line-to-neutral voltage)	Volts		X
25–24	Integer16	cos phi_{avg} (average of apparent power factor)	0–1000		X
29–26	Unsigned32	Energy	kWh		X
31–30	Unsigned16	S_{total} (total apparent power)	kVA		X

Section 8: PROFIBUS DP-V0 diagnostics

Until the PCAM is parameterized and configured by the PROFIBUS master, a request for diagnostics by the master will result in the PCAM returning only the mandatory 6-byte PROFIBUS diagnostics information.

Once successfully parameterized and configured, the PCAM will append additional device-related diagnostics information to the mandatory PROFIBUS diagnostics information, as described in Table 13. The diagnostics user data, starting at bit 24, is also described in the GSD file (Appendix A).

Note: Configuration is required before this additional information can be included because the user-defined "Data Object X invalid" bits are defined by and dependent upon the cyclic data exchange monitoring format selected. Any change in the PCAM diagnostic information is signaled to the PROFIBUS master when the PCAM returns a high priority cyclic data exchange.

Table 13. DP-V0 unit diagnostics definitions.

Byte	Bit(s)	Value	Description
7		08H	Header: device related diagnostics, length (8 bytes)
8	7–0	81H	Type (status message)
9	15–8	00H	Slot
10	23–16	00H	Specifier
11	24	1	No communications with trip unit
	25	1	Data Object 1 invalid (Monitoring Formats 1-4: I_{L1})
	26	1	Data Object 2 invalid (Monitoring Formats 1-4: I_{L2})
	27	1	Data Object 3 invalid (Monitoring Formats 1-4: I_{L3})
	28	1	Data Object 4 invalid (Monitoring Formats 1-4: $I_{L\,max}$)
	29	1	Data Object 5 invalid (Monitoring Formats 2-4: I_N)
	30	1	Data Object 6 invalid (Monitoring Formats 2: $V_{LL\,avg}$) (Monitoring Formats 3-4: $V_{L1\text{-}L2}$)
	31	1	Data Object 7 invalid (Monitoring Formats 2: cos phi_{avg}) (Monitoring Formats 3-4: $V_{L2\text{-}L3}$)
12	32	1	Data Object 8 invalid (Monitoring Formats 2: Energy) (Monitoring Formats 3-4: $V_{L3\text{-}L1}$)
	33	1	Data Object 9 invalid (Monitoring Formats 3-4: $V_{L1\text{-}N}$)
	34	1	Data Object 10 invalid (Monitoring Formats 3-4: $V_{L2\text{-}N}$)
	35	1	Data Object 11 invalid (Monitoring Formats 3-4: $V_{L3\text{-}N}$)
	36	1	Data Object 12 invalid (Monitoring Formats 3-4: cos phi_{avg})
	37	1	Data Object 13 invalid (Monitoring Formats 3-4: Energy)
	38	1	Data Object 14 invalid (Monitoring Formats 3-4: S_{total})
	39	1	Remote open/closed not enabled (i.e., remote enable switch disabled, see Section 5)
13	40	1	EEROM error alarm (primary status: alarm, cause: 43)
	41	1	RAM error alarm (primary status: alarm, cause: 39)
	42	1	Setpoints error alarm (primary status: alarm, cause: 77)
	43	1	Watchdog alarm (primary status: alarm, cause: 46)
	44	1	Check aux. switch alarm (primary status: alarm, cause: 148)
	45	1	Breaker mechanism fault (primary status: alarm, cause: 154)
	46	1	Breaker shunt trip problem (primary status: alarm, cause: 157)
	47	1	Operations count alarm (primary status: alarm, cause: 31)
14	48	1	Earth fault alarm (primary status: alarm, cause: 84, 85)
	49	1	Low power factor alarm (primary status: alarm, cause: 19)
	50	1	Total harmonic distortion alarm (primary status: alarm, cause: 30)
	51	1	Frequency out of bounds alarm (primary status: alarm, cause: 146)
	52	1	Historic trip occurred (primary status: closed, cause: 82)
	53	1	Breaker in Maintenance Mode (cause: 153)

Section 9: Troubleshooting

The following are the most common issues experienced with the installation of a PROFIBUS DP communications adapter module. If you have additional questions or need further information and/or instructions, please contact your local Eaton representative or visit www.eaton.com.

Observation 1 - Status LED not flashing.

Action - Verify proper input power to module connectors.

Observation 2 - Status LED flashing green, but module does not change state in response to master command requests.

Action - Verify correct module address.

Action - Verify communication cable is connected correctly from master to module.

Appendix A

PROFIBUS DP-V0—GSD profile document

```
; ============================
; GSD File for Eaton Low Voltage
  Circuit Breakers
;
; English Version 1.0
; Date: 2009-02-03
; revised by CC-TDH/P. Thiessmeier
; Changes:
  ; support of mandatory profile 1 (F0)
  ; changed to modular slave for better
    support of intel-based plcs
; Date: 2009-02-17
; revised by A.A. Anderson
; Changes:
  ; User_Prm_Data_Len = 3, to eventually support DP-V1
  ; Added Unit_Diag_Bit(0024-0052)
; Date: 2009-06-04
; revised by A.A. Anderson
; Changes:
  ; Added Module = "Add. Data of profile
    type 4" 0xDE
; Date: 2009-06-29
; revised by A.A. Anderson
; Changes:
  ; Comments (Slave related Key Words) Only
; ============================
#PROFIBUS_DP
;
; ============================
;General parameters
; ============================
GSD_Revision = 3
Vendor_Name = "Eaton Corporation"
Model_Name = "Magnum,IZM,NRX" ;"Low Voltage Circuit Breaker"
Revision = "V1.0" ;Revision version of device
;Revision_Number = ;Must agree with RevNum in slave-specific diag
Ident_Number = 0x0BF4
Protocol_Ident = 0 ;0=PROFIBUS DP
Station_Type = 0 ;0=DP Slave
FMS_supp = 0 ;0=Not FMS/DP mixed device
Hardware_Release = "V1.0" ;Hardware release of device
Software_Release = "V1.0" ;Software release of device
9.6_supp = 1
19.2_supp = 1
31.25_supp = 0
45.45_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp = 1
6M_supp = 1
12M_supp = 1
MaxTsdr_9.6 = 60 ; Bit Time
MaxTsdr_19.2 = 60 ; Bit Time
MaxTsdr_31.25 = 60 ; Bit Time
MaxTsdr_45.45 = 60 ; Bit Time
MaxTsdr_93.75 = 60 ; Bit Time
MaxTsdr_187.5 = 60 ; Bit Time
MaxTsdr_500 = 100 ; Bit Time
MaxTsdr_1.5M = 150 ; Bit Time
MaxTsdr_3M = 250 ; Bit Time
MaxTsdr_6M = 450 ; Bit Time
MaxTsdr_12M = 800 ; Bit Time
Redundancy = 0 ;0=Redundant Xmission NotSupported
Repeater_Ctrl_Sig = 2 ;CNTR-P bus signal:
  ; 0=NotConnected, 1=RS485 2=TTL
24V_Pins = 0 ;M24V & P24V bus signals:
  ; 0=NotConnected, 1=Input, 2=Output
Implementation_Type = "SPC3" ;Optional
; Bitmap_Device = "DIB_????" ;Optional
; Bitmap_Diag = "DIB_????" ;Optional
; Bitmap_SF = "DIB_????" ;Optional

; ============================
; Physical Interface parameters (optional)
; ============================
; Physical_Interface = 0 ;Optional RS485-intrinsic
; Transmission_Delay_9.6 = 0 ; Bit Time
; Transmission_Delay_19.2 = 0 ; Bit Time
; Transmission_Delay_31.25 = 0 ; Bit Time
; Transmission_Delay_45.45 = 0 ; Bit Time
```

```
; Transmission_Delay_93.75 = 0 ; Bit Time
; Transmission_Delay_187.5 = 0 ; Bit Time
; Transmission_Delay_500 = 0 ; Bit Time
; Transmission_Delay_1.5M = 0 ; Bit Time
; Transmission_Delay_3M = 0 ; Bit Time
; Transmission_Delay_6M = 0 ; Bit Time
; Transmission_Delay_12M = 0 ; Bit Time
; Reaction_Delay_9.6 = 0 ; Bit Time
; Reaction_Delay_19.2 = 0 ; Bit Time
; Reaction_Delay_31.25 = 0 ; Bit Time
; Reaction_Delay_45.45 = 0 ; Bit Time
; Reaction_Delay_93.75 = 0 ; Bit Time
; Reaction_Delay_187.5 = 0 ; Bit Time
; Reaction_Delay_500 = 0 ; Bit Time
; Reaction_Delay_1.5M = 0 ; Bit Time
; Reaction_Delay_3M = 0 ; Bit Time
; Reaction_Delay_6M = 0 ; Bit Time
; Reaction_Delay_12M = 0 ; Bit Time
; End_Physical_Interface

; ============================
; Slave-Specification
; ============================
Freeze_Mode_supp = 1 ;1=Supported
Sync_Mode_supp = 1 ;1=Supported
Auto_Baud_supp = 1 ;1=Supported
Set_Slave_Add_supp = 0
; 0=NotSupported (INCOM address
  setting)

User_Prm_Data_Len = 3
User_Prm_Data = 0x00,0x00,0x00
Max_User_Prm_Data_Len = 3
; Ext_User_Prm_Data_Const(0) = 0x00,0x00,0x00
Min_Slave_Intervall = 1 ;Min interval between two slave list cycles
  ; Time base: 100us
Modular_Station = 1 ;0=Compact, 1=Modular device
Max_Module = 2 ;
Max_Input_Len = 32 ;Circuit Breaker Profile input, format 4
Max_Output_Len = 2 ;Circuit Breaker Profile output
Max_Data_Len = 34
Fail_Safe = 0 ;0=DataMsg with data=0 in CLEAR mode
Modul_Offset = 0 ;Slot number to appear in Cfg tool
Slave_Family = 2@CircuitBreaker@Digitrip
Diag_Update_Delay = 0
Fail_Safe_required = 0
;Info_Text = " " ;Optional additional info about device

Max_Diag_Data_Len = 14 ;6 Bytes Mandatory by PROFIBUS
Unit_Diag_Bit(0024) = "No Communications with DigiTrip"
Unit_Diag_Bit(0025) = "Data Object 1 invalid"
Unit_Diag_Bit(0026) = "Data Object 2 invalid"
Unit_Diag_Bit(0027) = "Data Object 3 invalid"
Unit_Diag_Bit(0028) = "Data Object 4 invalid"
Unit_Diag_Bit(0029) = "Data Object 5 invalid"
Unit_Diag_Bit(0030) = "Data Object 6 invalid"
Unit_Diag_Bit(0031) = "Data Object 7 invalid"

Unit_Diag_Bit(0032) = "Data Object 8 invalid"
Unit_Diag_Bit(0033) = "Data Object 9 invalid"
Unit_Diag_Bit(0034) = "Data Object 10 invalid"
Unit_Diag_Bit(0035) = "Data Object 11 invalid"
Unit_Diag_Bit(0036) = "Data Object 12 invalid"
Unit_Diag_Bit(0037) = "Data Object 13 invalid"
Unit_Diag_Bit(0038) = "Data Object 14 invalid"
Unit_Diag_Bit(0039) = "Remote Open/Closed Not Enabled"

Unit_Diag_Bit(0040) = "EEROM Error Alarm"
Unit_Diag_Bit(0041) = "RAM Error Alarm"
Unit_Diag_Bit(0042) = "Setpoints Error Alarm"
Unit_Diag_Bit(0043) = "Watchdog Alarm"
Unit_Diag_Bit(0044) = "Check Aux Switch Alarm"
Unit_Diag_Bit(0045) = "Breaker Mechanism Fault"
Unit_Diag_Bit(0046) = "Breaker Shunt Trip Problem"
Unit_Diag_Bit(0047) = "Operations Count Alarm"

Unit_Diag_Bit(0048) = "Earth Fault Alarm"
Unit_Diag_Bit(0049) = "Low Power Factor Alarm"
Unit_Diag_Bit(0050) = "Total Harmonic Distortion Alarm"
Unit_Diag_Bit(0051) = "Frequency Out Of Bounds Alarm"
Unit_Diag_Bit(0052) = "Historic Trip Occurred"
Unit_Diag_Bit(0053) = "Breaker In Maintenance Mode"
```

```
; *********************************
; ** Slave related Key Words for DP extensions **
; *********************************
DPV1_Slave = 0
; C1_Read_Write_supp = 1
; C2_Read_Write_supp = 1
; C1_Max_Data_Len = 22
; C2_Max_Data_Len = 48
; C1_Response_Timeout = 50 ;in units of
  10ms, optional
; C2_Response_Timeout = 50 ;in units of
  10ms, optional
; C1_Read_Write_required = 0
; C2_Read_Write_required = 0
; C2_Max_Count_Channels = 1
; Max_Initiate_PDU_Length = 52
; Diagnostic_Alarm_supp = 0
; Process_Alarm_supp = 0
; Pull_Plug_Alarm_supp = 0
; Status_Alarm_supp = 0
; Update_Alarm_supp = 0
; Manufacturer_Specific_Alarm_supp = 0
; Extra_Alarm_SAP_supp = 0
; Alarm_Sequence_Mode_Count = 0
; Alarm_Type_Mode_supp = 0
; Diagnostic_Alarm_required = 0
; Process_Alarm_required = 0
; Pull_Plug_Alarm_required = 0
; Status_Alarm_required = 0
; Update_Alarm_required = 0
; Manufacturer_Specific_Alarm_required = 0
; DPV1_Data_Types = 0
; WD_Base_1ms_supp = 1
; Check_Cfg_Mode = 0
; Publisher_supp = 0

; ============================
; Module Definition List
; ============================
Module = "Profile type 1" 0x31
1
EndModule

Module = "Add. data of profile type 2" 0xD3
2
Ext_Module_Prm_Data_Len = 0
EndModule

Module = "Add. Data of profile type 3" 0xD7
3
Ext_Module_Prm_Data_Len = 0
EndModule

Module = "Add. Data of profile type 4" 0xDD
4
Ext_Module_Prm_Data_Len = 0
EndModule

Module = "Add. Data of profile type 5" 0xDE
5
Ext_Module_Prm_Data_Len = 0
EndModule

Module = "No additional data" 0x00
6
EndModule

SlotDefinition
Slot (1) = "Profile type 1"    1          1-1
Slot (2) = "Additional data"   2          2-6
EndSlotDefinition
```

Appendix B

Primary/Secondary/Cause

The Primary/Secondary/Cause status information are binary encoded values. The definition of primary status byte is listed in Table 14. The definition of the secondary status byte is listed in Table 15. The definition of the cause-of-status word (pertaining to the primary status) is listed in Table 16.

Table 14. Primary status code definitions.

Definition	Code
Open	0x01
Closed	0x02
Tripped	0x03
Picked-up	0x0D

Table 15. Secondary status code definitions.

Definition	Code
Not Applicable	0x01
Test mode	0x03
Powered up since last trip/alarm reset	0x07
Alarm	0x08

Table 16. Cause-of-status code definitions.

Definition	Code	Definition	Code
Unknown	0x0000	Bad/missing rating plug	0x0040
Normal	0x0001	Reverse power	0x0041
Instantaneous	0x0003	Reverse sequence	0x0044
Overvoltage	0x000B	Phase current loss	0x0045
Undervoltage	0x000C	Phase currents near pickup, high load alarm	0x0049
Auxiliary power under power	0x000E	Making current release	0x004B
Overfrequency	0x000F	Fixed hardware instantaneous	0x004C
Underfrequency	0x0010	Setpoints error	0x004D
Current unbalance	0x0011	Over-temperature	0x004E
Voltage unbalance	0x0012	Long delay neutral overcurrent	0x0050
Apparent power factor	0x0013	Ground fault	0x0054
Power demand	0x001A	Earth fault	0x0055
VA demand	0x001B	Calibration	0x0071
Total harmonic distortion	0x001E	Real time clock	0x088
Operations count	0x001F	MM mode	0x0099
Control via communication	0x0021	Breaker mechanism fault	0x009A
Coil supervision	0x0025	RAM error	0x07FC
Diagnostic warnings	0x0027	Non-volatile memory error	0x07FD
Long delay	0x003D	Watchdog fault	0x07FE
Short delay	0x003E	ROM error	0x07FF

PCAM instructions for profibus dp communications adapter module

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