DNP3 DEVICE PROFILE DOCUMENT

Vendor Name: **PNC Technologies**

Device Name**: Current Relay(PAC-E100ST)**

Highest DNP Level Supported: For Requests: **Level 2** For Responses: **Level 2**	**Device Function:** Remote ☐ Master ☒ Remote

Notable objects, functions, and/or qualifiers supported, in addition to the Highest DNP Levels Supported.

(The complete list is described in the attached implementation table):

Binary Inputs(Object 1)

Binary Input Changes(Object 2)

Binary Outputs(Object 10)

Binary Counters(Object 20)

Analog Inputs(Object 30)

Maximum Data Link Frame Size (octets): Transmitted: **292** Received: **292**	**Maximum Application Fragment Size (octets):** Transmitted: **240** Received: **2048**
Maximum Data Link Re-tries: ☐ None ☐ Fixed ☒ Configurable, range **0** to **5**	**Maximum Application Layer Re-tries:** ☒ None ☐ Configurable

Requires Data Link Layer Confirmation:

☐ Never

☐ Always

☐ Sometimes

☒ Configurable

Requires Application Layer Confirmation:

☐ Never (recommended for master devices)

☐ Always (not recommended)

☒ When reporting Event Data

☒ When sending multi-frame fragment responses

☐ Sometimes

☐ Configurable

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Timeouts while waiting for:

Data Link Confirm:	☐ None	☐ Fixed at___	☐ Variable	
	☒ Configurable, range 0.001 s to 65 s			
Complete Appl. Fragment:	☒ None	☐ Fixed at___	☐ Variable	☐ Configurable
Application Confirm:	☐ None	☒ Fixed at 10 s	☐ Variable	☐ Configurable
Complete Appl. Response:	☒ None	☐ Fixed at___	☐ Variable	☐ Configurable

Others:

Transmission Delay:	**configurable, range 0 to 65000 ms**
Inter-character Timeout:	**50 ms**
Need Time Delay:	**configurable, range 0 to 65000 min(0: disable)**
Select/Operate Arm Timeout:	**configurable, range 1 to 65000 ms**
Binary input change scanning period:	**50 ms**

Default Status Object/Variation:	**Default Analog Object/Variation:**
☐ No Status objects reported	☐ No Analog objects reported
☐ Configurable (attach explanation)	☐ Configurable (attach explanation)
☐ Default Static Object_____	☐ Default Static Object_____
☐ Default Static Variation _____	☐ Default Static Variation _____
☐ Default Event Object_____	☐ Default Event Object_____
☐ Default Event Variation _____	☐ Default Event Variation _____
☒ Point-by-point list attached	☒ Point-by-point list attached

Default Counter Object/Variation:	**Counters Roll Over at:**
☐ No Counters reported	☐ No Counters Reported
☐ Configurable (attach explanation)	☐ Configurable (attach explanation)
☐ Default Static Object_____	☐ 16 Bits
☐ Default Static Variation_____	☐ 32 Bits
☐ Default Event Object_____	☐ Other Value _____
☐ Default Event Variation _____	☒ Point-by-point list attached
☒ Point-by-point list attached	

Default Frozen Counter Object/Variation: ☒ No Frozen Counters reported ☐ Configurable (attach explanation) ☐ Default Static Object_____ ☐ Default Static Variation_____ ☐ Default Event Object_____ ☐ Default Event Variation _____ ☐ Point-by-point list attached	**Counters frozen by means of:** ☐ Remote device time based ☐ Fixed time ☐ Configurable; range _____ to _____ ☐ Master Request (see implementation table for supported function codes) ☐ Both
Analog Deadbands: ☐ Fixed ☐ Configurable: ☐ Per Point ☐ Per Analog Type ☐ Global	**Configuring Analog Deadbands:** ☒ Not Applicable ☐ Configuration Software ☐ Using Object 34 from the master station ☐ Both configuration software and Object 34
Are the updated deadband values preserved through a device reset: ☐ YES ☒ NO	
The number of multiple objects allowed in a single read request message: Number of multiple objects allowed: **16**	
Ability to DISABLE/ENABLE DNP database points: ☒ Not Applicable ☐ Per point ☐ Per object ☐ Global	**IIN 1-6 Device Trouble Bit** ☐ Never used ☒ Reason for setting: **system error**

Sends/Executes Digital Control Operations:

SELECT/OPERATE	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
DIRECT OPERATE	☐ Never	☒ Always	☐ Sometimes	☐ Configurable
DIRECT OPERATE – NO ACK	☐ Never	☒ Always	☐ Sometimes	☐ Configurable

Count > 1	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Pulse On	☐ Never	☐ Always	☒ Sometimes	☐ Configurable
Pulse Off	☐ Never	☐ Always	☒ Sometimes	☐ Configurable
Latch On	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Latch Off	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Trip/Close	☐ Never	☐ Always	☒ Sometimes	☐ Configurable
Raise/Lower	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Queue	☒ Never	☐ Always	☐ Sometimes	☐ Configurable
Clear Queue	☒ Never	☐ Always	☐ Sometimes	☐ Configurable

Sends Unsolicited Responses:

- ☒ Never
- ☐ Configurable (attach explanation)
- ☐ Only certain objects
- ☐ Sometimes (attach explanation)

Sends Static Data in Unsolicited Responses:

- ☒ Never
- ☐ When Device Restarts
- ☐ When Status Flags Change

* No other options permitted.

Assign Class Function code supported:

- ☒ NO
- ☐ YES
  - ☐ Per Object
  - ☐ Per Point
  - ☐ Configurable

Is the Event Buffer size configurable:

- ☒ NO fixed size: **255(BI Change Only)**
- ☐ YES: range: _____to_____

Configurable Per Class buffer:

- ☒ NO
- ☐ YES

Supports Collision Avoidance:

- ☒ Never
- ☐ Always (attach explanation)
- ☐ Configurable (attach explanation)

Source Address Filtering:

- ☒ Not Supported
- ☐ Configurable

Supports Multi-drop communications: ☒ Yes ☐ No

Sends Multi-Fragment Responses: ☒ Yes ☐ No

IMPLEMENTATION TABLE

DNP OBJECT & VARIATION			REQUEST		RESPONSE	
OBJ	**VAR**	**Description**	**Func Codes(dec)**	**Qual Codes (hex)**	**Func Codes(dec)**	**Qual Codes(hex)**
1	0	Binary Input - All Variations	*1 (read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*		
	1	Binary Input *(default)*	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*
	2	Binary Input with Status	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*
2	0	Binary Input Change - All Variations	*1(read)*	*06 (no range,or all)* *07,08 (limited qty)*		
	1	Binary Input Change without Time	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*17,28 (index)*
	2	Binary Input Change with Time *(default)*	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*17,28 (index)*
10	0	Binary Output Status-All Variation	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*		
	2	Binary Output Status *(default)*	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*17,28 (index)*
12	1	Control Relay Output Block	*3(select)* *4(operate)* *5(direct op)* *6(direct op noack)*	*17,28 (index)*	*129 (response)*	*echo of request*
20	0	Binary Counter- All Variations	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*		
	1	32-Bit Binary Counter	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*

DNP OBJECT & VARIATION			REQUEST		RESPONSE	
OBJ	**VAR**	**Description**	**Func Codes(dec)**	**Qual Codes (hex)**	**Func Codes(dec)**	**Qual Codes(hex)**
	2	16-Bit Binary Counter	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*
	5	32-Bit Binary Counter without Flag	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*
	6	16-Bit Binary Counter without Flag *(default)*	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*
30	0	Analog Input- All Variations	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*		
	2	16-Bit Analog Input *(default)*	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*
	4	16-Bit Analog Input without Time	*1(read)*	*00,01(start-stop)* *06 (no range,or all)* *07,08 (limited qty)*	*129 (response)*	*00,01(start-stop)*
50	1	Time and Date *(default)*	*1(read)* *2(write)*	*07 (limited qty=1)*		*00(start-stop)*
52	2	Time Delay Fine			*129 (response)*	*07 (limited qty=1)*
60	1	Class 0 Data	*1(read)*	*06 (no range,or all)* *07,08 (limited qty)*		
	2	Class 1 Data	*1(read)*	*06 (no range,or all)* *07,08 (limited qty)*		
	3	Class 2 Data	*1(read)*	*06 (no range,or all)* *07,08 (limited qty)*		
	4	Class 3 Data	*1(read)*	*06 (no range,or all)* *07,08 (limited qty)*		
80	1	Internal Indications	*2(write)*	*00(start-stop)* *(index must=7)*		
--		No Object(function code only)	*13(cold restart)*			
--		No Object(function code only)	*14(warm restart)*			

DNP OBJECT & VARIATION			REQUEST		RESPONSE	
OBJ	**VAR**	**Description**	**Func Codes(dec)**	**Qual Codes (hex)**	**Func Codes(dec)**	**Qual Codes(hex)**
--		No Object(function code only)	*23(delay meas.)*			

DNP Point LISTS

Binary Input			
Point Index	**Description**	**Object/Variation**	**Class**
0	(*)System Reset	01/01,01/02,02/01,02/02	1
1	(*)System Warm Restart	01/01,01/02,02/01,02/02	1
2	(*)System Error	01/01,01/02,02/01,02/02	1
3 ~9	Contact Input 1 Operated ~ Contact Input 7 Operated	01/01,01/02,02/01,02/02	1
10 ~ 14	Contact Output 1 Operated ~ Contact Output 5 Operated	01/01,01/02,02/01,02/02	1
15	Trip LED	01/01,01/02,02/01,02/02	0
16 ~21	Program LED1~6	01/01,01/02,02/01,02/02	0
22 ~25	USER Logic1~4	01/01,01/02,02/01,02/02	0
26 ~ 29	Setting Group 1 Active ~ Setting Group 4 Active	01/01,01/02,02/01,02/02	1
30	Breaker Local / Remote	01/01,01/02,02/01,02/02	0
31	Breaker Status	01/01,01/02,02/01,02/02	1
32	(*)Trip Circuit Supervision Alarm	01/01,01/02,02/01,02/02	1
33	(*)CB Wear Monitor Alarm	01/01,01/02,02/01,02/02	1
34	50_1 Phase A Operated	01/01,01/02,02/01,02/02	1
35	50_1 Phase B Operated	01/01,01/02,02/01,02/02	1
36	50_1 Phase C Operated	01/01,01/02,02/01,02/02	1
37	50_2 Phase A Operated	01/01,01/02,02/01,02/02	1
38	50_2 Phase B Operated	01/01,01/02,02/01,02/02	1
39	50_2 Phase C Operated	01/01,01/02,02/01,02/02	1
40	51 Phase A Operated	01/01,01/02,02/01,02/02	1
41	51 Phase B Operated	01/01,01/02,02/01,02/02	1
42	51 Phase C Operated	01/01,01/02,02/01,02/02	1

43	50N_1 Operated	01/01,01/02,02/01,02/02	1
44	50N_2 Operated	01/01,01/02,02/01,02/02	1
45	51N Operated	01/01,01/02,02/01,02/02	1
46	37 Phase A Operated	01/01,01/02,02/01,02/02	1
47	37 Phase B Operated	01/01,01/02,02/01,02/02	1
48	37 Phase C Operated	01/01,01/02,02/01,02/02	1
49	49 Alarm	01/01,01/02,02/01,02/02	1
50	49 Trip	01/01,01/02,02/01,02/02	1
51	46 Operated	01/01,01/02,02/01,02/02	1
52	50BF Operated	01/01,01/02,02/01,02/02	1
53	Cold Load Pickup Operated	01/01,01/02,02/01,02/02	1
54	Inrush Detection (I2/I1) Operated	01/01,01/02,02/01,02/02	1
55	79 Ready	01/01,01/02,02/01,02/02	0
56	(*)79 In progress	01/01,01/02,02/01,02/02	1
57	(*)79 Fail	01/01,01/02,02/01,02/02	1

(*) Event are captured only when its status is changed 'OFF' to 'ON'.

Binary Output ***.Count Field : No Action(0),Execute Once(>0)** ****.On/Off Time Field ignore**				
Point Index	**Description**	**Object/Variation**	**Control Code**	**Count**
0	Open Breaker	02/01,02/02,12/01	Pulse On,Trip	1
	Close Breaker		Pulse On,Close	1
1	Reset Annunciator	02/01,02/02,12/01	Pulse On,Close	1
2	Clear Event Data	02/01,02/02,12/01	Pulse On,Close	1
3	Clear Waveform Data	02/01,02/02,12/01	Pulse On,Close	1
4	Clear Thermal Data	02/01,02/02,12/01	Pulse On,Close	1
5	Clear CB Monitor Data	02/01,02/02,12/01	Pulse On,Close	1
6	Setting Group 1 Active	02/01,02/02,12/01	Pulse On,Close	1
7	Setting Group 2 Active	02/01,02/02,12/01	Pulse On,Close	1
8	Setting Group 3 Active	02/01,02/02,12/01	Pulse On,Close	1
9	Setting Group 4 Active	02/01,02/02,12/01	Pulse On,Close	1

Binary Counter *.Counter freeze command has no meaning .				
Point Index	**Description**	**Object/Variation**	**Class**	**RollOver**
0	# of Available Events	20/02,20/06	--	Max 700
1	# of Available Waveforms	20/02,20/06	--	Max 16

Analog Input					
Point Index	**Description**	**Object/Variation**	**Class**	**Range**	**Unit**
0	Phase A Current Magnitude.	30/02,30/04	--	0.000~65.535	kA
1	Phase B Current Magnitude.	30/02,30/04	--	0.000~65.535	kA
2	Phase C Current Magnitude.	30/02,30/04	--	0.000~65.535	kA
3	Phase N Current Magnitude.	30/02,30/04	--	0.000~65.535	kA
4	Positive Phase Sequence Current Magnitude.	30/02,30/04	--	0.000~65.535	kA
5	Negative Phase Sequence Current Magnitude.	30/02,30/04	--	0.000~65.535	kA
6	Zero Phase Sequence Current Magnitude.	30/02,30/04	--	0.000~65.535	kA
7	Phase A 2nd harmonic Current Magnitude	30/02,30/04	--	0.000~65.535	kA
8	Phase B 2nd harmonic Current Magnitude	30/02,30/04	--	0.000~65.535	kA
9	Phase C 2nd harmonic Current Magnitude	30/02,30/04	--	0.000~65.535	kA
10	Frequency of Phase A Current	30/02,30/04	--	0.00~655.35	Hz
11	Thermal Accumulation State	30/02,30/04	--	0.0~250.0	%
12	Phase A CB Monitor Data	30/02,30/04	0	0.0~250.0	%
13	Phase B CB Monitor Data	30/02,30/04	0	0.0~250.0	%
14	Phase C CB Monitor Data	30/02,30/04	0	0.0~250.0	%