Measurlogic DTS MCM BACnet/IP Object Map

Revision R26A

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1 SCOPE

1.1 IDENTIFICATION

This document describes the BACnet Communications Object specification for the Measurlogic family of DTS MCM Multi-Circuit Monitoring systems. The DTS MCM consists of 3, 4, 6 or 8 DTS 307 meters that are prewired with a circuit breaker, housed in a weatherproof container, together with a DTS E4C for Modbus TCP and BACnet/IP Ethernet communication.

Further information about the DTS MCM can be found on the Measurlogic website here.

1.2 INTRODUCTION

Ethernet communications is provided through the DTS E4C Converter module:

- The Measurlogic DTS Discover application is used to find any DTS E4C Converter modules on the network, and to reconfigure the IP Address and any other networking parameters.
- The IP Address of each device must be unique on the Ethernet sub-net as per normal TCP/IP networking requirements.
- Unless specified, the default BACnet/IP Device_ID of the DTS MCM will be 473001, which must be unique on the BACnet network. The Device_ID can be viewed and changed using the "BACnet Settings" page in the embedded webpages.
- In addition to the BACnet/IP protocol, Modbus TCP is also available for configuration purposes only using DTS Config. To communicate with any of the DTS 307 meters in the system, connect to the DTS E4C IP Address at Port 502, and the Modbus Address is the same as the meter number in the system.
- For quick BACnet testing, we suggest the "Yet Another BACnet Explorer (YABE)" project.

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1.3 EMBEDDED WEBPAGES

The DTS E4C Ethernet communications module in the DTS MCM is equipped with embedded webpages, which can be used to:

- Configure the Device_ID for the BACnet/IP protocol — BACnet Settings page
- Configure the Current Transformer Type and Rating for each meter — Electrical Settings page
- Change the network settings — Network Settings page
- View instantaneous measurement values and energies for each meter — Monitor & Energy pages

1.4 YOUTUBE VIDEOS

The Measurlogic youtube channel hosts some useful instruction videos for finding, connecting to and configuring your Ethernet DTS meter:

- Accessing Embedded Webpages - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=ckjAoacdZ6o
- Navigating Embedded Webpages - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=om70QA8-pdo
- DTS Discover - DTS Meter Network Connectivity: https://www.youtube.com/watch?v=xJLadESTqqU
- Connecting your DTS MCM Multi Circuit Monitor: https://www.youtube.com/watch?v=YAaW0I6dRyq&t=31s

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2 BACNET INTERFACE SPECIFICATION

2.1 GENERAL INFORMATION

2.1.1 BACnet Object_Types and Properties

The measurement values of the DTS MCM sub-metering system are exposed using BACnet Objects and Properties.

The following BACnet objects are supported:

- Device Object
- Analog_Input AI
- Analog_Value AV (Writable)

The object instance number can be found in the following tables. The value of the Object is contained in the Present_Value property. All Present_Value properties are 32-bit "float" values. As such they are able to represent floating point values so always represent the appropriate engineering units, and thus no scaling is required. The Object_Name property contains the name of measurement quantity.

2.1.2 BACnet Object Arrangement

The DTS MCM Object map is arranged with the common objects grouped first, followed by the measurement values for the multi-circuit meters. The number of measurement groups is dependent on the DTS MCM model number.

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2.2 DTS MCM Objects

2.2.1 Common Objects

Unless specified, the default BACnet/IP Device_ID of the DTS MCM will be 473001, which must be unique on the BACnet network. The Device_ID can be viewed and changed using the Device_ID object.

The voltage and frequency objects are common to the whole DTS MCM system.

Object Name	Object Description	Type	Number	Units
Volt_LN_1	Voltage Line-to-Neutral A	AI	1001	Volts
Volt_LN_2	Voltage Line-to-Neutral B	AI	1002	Volts
Volt_LN_3	Voltage Line-to-Neutral C	AI	1003	Volts
Volt_LL_12	Voltage Line-to-Line A-B	AI	1005	Volts
Volt_LL_23	Voltage Line-to-Line B-C	AI	1006	Volts
Volt_LL_31	Voltage Line-to-Line C-A	AI	1007	Volts
Frequency	Frequency	AI	1009	Hz

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2.2.2 Multi-Circuit Objects

The measurement circuits of the DTS MCM sub-metering system are arranged in groups of 3 circuits on each DTS 307 meter in the system.

2.2.2.1 DTS 307 Meter Number 1

Every DTS MCM will have at least 1 DTS 307 meter so meter number 1 will always be present.

Object Name	Object Description	Type	Number	Units
Curr_1_1	Current Phase A	AI	1101	Amperes
Curr_1_2	Current Phase B	AI	1102	Amperes
Curr_1_3	Current Phase C	AI	1103	Amperes
PowerP_1_1	Active Power Phase A	AI	1107	kW
PowerP_1_2	Active Power Phase B	AI	1108	kW
PowerP_1_3	Active Power Phase C	AI	1109	kW
PowerP_1_Tot	Active Power Total	AI	1110	kW
PF_1_1	Power Factor Phase A	AI	1119	
PF_1_2	Power Factor Phase B	AI	1120	
PF_1_3	Power Factor Phase C	AI	1121	
DmdP_1_Tot	Instantaneous Demand	AI	1131	kW
DmdP_1_Tot_Max	Maximum Demand	AI	1132	kW
EnergyP_1_1	Active Energy Phase A (net)	AI	1141	kWh
EnergyP_1_2	Active Energy Phase B (net)	AI	1142	kWh
EnergyP_1_3	Active Energy Phase C (net)	AI	1143	kWh
EnergyP_1_Tot	Active Energy Total (net)	AI	1144	kWh
EnergyP_1_Tot_Imp	Active Energy consumed from grid	AI	1153	kWh
EnergyP_1_Tot_Exp	Active Energy returned to grid	AI	1154	kWh

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2.2.2.2 DTS 307 Meter Number "n"

The number of DTS 307 meters in the DTS MCM is model dependent as follows:

MCM Model Number	Number of Circuits	N x Groups
DTS MCM-x-9C	9	3
DTS MCM-x-12C	12	4
DTS MCM-x-18C	18	6
DTS MCM-x-24C	24	8

There is a total of **N** groups of objects for each DTS MCM system.
The numbering convention for each repeated group is shown below, where **n** is in the range **[2..N]**.

Object Name	Object Description	Type	Number	Units
Curr_n_1	Current Phase A	AI	1n01	Amperes
Curr_n_2	Current Phase B	AI	1n02	Amperes
Curr_n_3	Current Phase C	AI	1n03	Amperes
PowerP_n_1	Active Power Phase A	AI	1n07	kW
PowerP_n_2	Active Power Phase B	AI	1n08	kW
PowerP_n_3	Active Power Phase C	AI	1n09	kW
PowerP_n_Tot	Active Power Total	AI	1n10	kW
PF_n_1	Power Factor Phase A	AI	1n19	
PF_n_2	Power Factor Phase B	AI	1n20	
PF_n_3	Power Factor Phase C	AI	1n21	
DmdP_n_Tot	Instantaneous Demand	AI	1n31	kW
DmdP_n_Tot_Max	Maximum Demand	AI	1n32	kW
EnergyP_n_1	Active Energy Phase A (net)	AI	1n41	kWh
EnergyP_n_2	Active Energy Phase B (net)	AI	1n42	kWh
EnergyP_n_3	Active Energy Phase C (net)	AI	1n43	kWh
EnergyP_n_Tot	Active Energy Total (net)	AI	1n44	kWh
EnergyP_n_Tot_Imp	Active Energy consumed from grid	AI	1n53	kWh
EnergyP_n_Tot_Exp	Active Energy returned to grid	AI	1n54	kWh

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2.2.2.3 Example

A DTS MCM system will have the same number of groups of BACnet objects as the number of DTS 307 meters that are needed for that model. The table below shows the instances of the **"PowerP_n_Tot"** object that you can expect to find in the four main DTS MCM models, as well as the "AI" object numbers for each of those instances.

Example for "PowerP_n_Tot" for the different DTS MCM models				
Object Name	**DTS MCM-x-9C (3 Meters)**	**DTS MCM-x-12C (4 Meters)**	**DTS MCM-x-18C (6 Meters)**	**DTS MCM-x-24C (8 Meters)**
PowerP_1_Tot	1110	1110	1110	1110
PowerP_2_Tot	1210	1210	1210	1210
PowerP_3_Tot	1310	1310	1310	1310
PowerP_4_Tot		1410	1410	1410
PowerP_5_Tot			1510	1510
PowerP_6_Tot			1610	1610
PowerP_7_Tot				1710
PowerP_8_Tot				1810

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