EtherNet/IP Object Model

Revision 1.0

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EtherNet/IP Object Model

Table 1 describes data types used in this object model.

Table 1. Data Types

Data Type	Description
USINT	Unsigned Short Integer (8-bit)
UINT	Unsigned Integer (16-bit)
UDINT	Unsigned Double Integer (32-bit)
SINT	Signed Integer (8-bit)
INT	Signed Integer (16-bit)
DINT	Signed Integer (32-bit)
STRING	Character String (1 byte per character)
SHORT STRINGnn	Character String (1st byte is length; up to nn characters)
STRINGI	International String format
BYTE	Bit String (8-bits)
WORD	Bit String (16-bits)
DWORD	Bit String (32-bits)
REAL	IEEE 32-bit Single Precision Floating Point

Identity Object (01_{HEX} - 1 Instance)

The following tables contain the attribute, status, and common services information for the identity object.

Table 2. Identity Object (01_{HEX} - 1 Instance)

Instance	Attribute ID	Name	CIP	Instance	Attribute ID
Class (Instance 0)	1	Revision	UINT	1	Get
Instance 1	1	Vendor number	UINT	1522	Get
	2	Device type	UINT	0x2B	Get
	3	Product code number	UINT	43244	Get
	4	Product major revision Product minor revision	USINT USINT	Fill In	Get
	5	Status	WORD	See	Get
	6	Serial number	UDINT	Unique 32 bit value (Last 4 of MAC ID)	Get
	7	Product name	SHORT STRING32	MX SERIES MACHINE INTRFACE MOD	Get

Table 3. Identity Object's Common Services

Service Code	Implemented for		Service Name
	Class Level	Instance Level	
05_{Hex}	No	Yes	Reset
$0E_{Hex}$	Yes	Yes	Get_Attribute_Single
10_{Hex}	No	Yes	Set_Attribute_Single

Message Router Object (02_{HEX} - 1 Instance)

No supported services or attributes

Assembly Object (04_{HEX} - 4 Instance)

The following tables contain the attribute, instance, data mapping, and common services information for the Assembly Object.

Table 4. Assembly Object (04_{HEX} – 2 Instances)

Instance	Attribute ID	Name	CIP Data Type	Data Value	Access Rule
Class (Instance 0)	1	Revision	UINT	2	Get
	2	Max instance	UINT	199	Get
100 (0x64)	3	T2O (Input) Controller + 8 Emitters (see below Table 5)	USINT[212]	Varies	Get
101 (0x65)	3	T2O (Input) Controller + 4 Emitters (see below Table 5 for bytes 0 to 115)*	USINT[116]	Varies	Get
102 (0x66)	3	T2O (Input) Controller + 2 Emitters (see below Table 5 for bytes 0 to 67)	USINT[68]	Varies	Get
112 (0x70)	3	O2T (Output) Controller + 8 Emitters (see below Table 6)	USINT[12]	Varies	Get/Set
113 (0x71)	3	O2T (Output) Controller + 4 Emitters (see below Table 6 for bytes 0 to 7)*	USINT[8]	Varies	Get/Set
114 (0x72)	3	O2T (Output) Controller + 2 Emitters (see below Table 6 for bytes 0 to 5)	USINT[6]	Varies	Get/Set
198 (0xC6)	N/A	Input only heartbeat1	Heartbeat	0	n/a
199 (0xC7)	N/A	Listen only heartbeat2	Heartbeat	0	n/a
Unused (n)	N/A	Configuration3			

* indicates the module to be used by default

NOTES:

1. This instance allows clients (PLCs) to monitor input data without providing output data.
2. This instance allows clients (PLCs) to monitor input data without providing output data. To use this connection type, an owning connection must exist from a second client and the configuration of the connection must match exactly.
3. Configuration data is not required, but it must match if supplied. Contents of the configuration instance are yet to be determined.

Table 5. T2O (Input) Controller + 8 Emitters Data Format

Byte	Data Type	Description (Command – Field)	ASCII Response ('#' represents 0 for controller and 1-8 for emitters)
0-3	SINT[4]	Echo Data	Same value as Output O2T Data [0-3]
4	SINT	Get Controller Status – System Status	"GCS <SystemStatus>:<AlarmIndex>:<MaxTemp>:<Temp>:<Volts>\r"
5	SINT	Get Controller Status – Alarm Index	"GCS <SystemStatus>:<AlarmIndex>:<MaxTemp>:<Temp>:<Volts>\r"
6-7	SINT[2]	Reserved	
8-11	REAL	Get Controller Status – MaxTempMax Temp	"GCS <SystemStatus>:<AlarmIndex>:<MaxTemp>:<Temp>:<Volts>\r"
12-15	REAL	Get Controller Status – TempTemp	"GCS <SystemStatus>:<AlarmIndex>:<MaxTemp>:<Temp>:<Volts>\r"
16-19	REAL	Get Controller Status – Volts	"GCS <SystemStatus>:<AlarmIndex>:<MaxTemp>:<Temp>:<Volts>\r"
20	SINT	Get Emitter 1 Status – Alarm Index	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"
21	SINT	Get Emitter 1 Status – Fan Speed	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"
22	SINT	Get Emitter 1 Status – LED State	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"
23	SINT	Get Emitter 1 Status – Power Level	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"
24-27	REAL	Get Emitter 1 Status – Max Temp	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"
28-31	REAL	Get Emitter 1 Status – Temp	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"

Table 5 Continued. T2O (Input) Controller + 8 Emitters Data Format

Byte	Data Type	Description (Command – Field)	ASCII Response ('#' represents 0 for controller and 1-8 for emitters)
32-35	REAL	Get Emitter 1 Status – Max Current	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"
36-39	REAL	Get Emitter 1 Status – Current	"GE#S <AlarmIdx>:<MaxTemp>:<Temp>:<MaxCurrent>:<Current>:<Interlock>:<LedState>:<PowerLevel>\r"
40-43	SINT[4]	Emitter 1 Reserved	
44-67	SINT[24]	Emitter 2	See Emitter 1
68-91	SINT[24]	Emitter 3	See Emitter 1
92-115	SINT[24]	Emitter 4	See Emitter 1
116-139	SINT[24]	Emitter 5	See Emitter 1
140-163	SINT[24]	Emitter 6	See Emitter 1
164-187	SINT[24]	Emitter 7	See Emitter 1
188-211	SINT[24]	Emitter 8	See Emitter 1

Table 6. Emitter # Acyclic Object

Byte	Data Type	Description (Command – Field)	ASCII Command – No Response Data ('#' represents 1-8 for emitters)
0	BYTE	Set Emitter LED State Bit 0: Emitter 1 … Bit 7: Emitter 8	SEO# 1 (where # = this byte) SEO# 0 (where # = ~byte)
1	SINT	Reset Unit	"RSTU\r"
2	SINT	Reset Alarms	"RSTA\r"
3	SINT	Reserved	
4	SINT	Set Emitter 1 Power Level – Power Level	"SEP1 <PowerLevel>\r"
5	SINT	Set Emitter 2 Power Level – Power Level	"SEP2 <PowerLevel>\r"
6	SINT	Set Emitter 3 Power Level – Power Level	"SEP3 <PowerLevel>\r"
7	SINT	Set Emitter 4 Power Level – Power Level	"SEP4 <PowerLevel>\r"
8	SINT	Set Emitter 5 Power Level – Power Level	"SEP5 <PowerLevel>\r"
9	SINT	Set Emitter 6 Power Level – Power Level	"SEP6 <PowerLevel>\r"
10	SINT	Set Emitter 7 Power Level – Power Level	"SEP7 <PowerLevel>\r"
11	SINT	Set Emitter 8 Power Level – Power Level	"SEP8 <PowerLevel>\r"

Table 7. Assembly Object's Common Services

Service Code	Implemented For		Service Name
	Class Level	Instance Level	
0EHex	Yes	Yes	Get_Attribute_Single
10Hex	No	Yes	Set_Attribute_Single

Connection Manager Object (06_{HEX})

No supported services or attributes

TCP Object ($F5_{HEX}$ - 1 Instance)

The following tables contain the attribute and common services information for the TCP Object.

Table 8. TCP Object (F5HEX - 1 Instance)

Instance	Attribute ID	Name	Data Type	Data Value	Access Rule
Class (Instance 0)	1	Revision	UINT	1	Get
Instance 1	1	Status*	DWORD	Varies	Get
	2	Configuration capability*	DWORD	Varies	Get
	3	Configuration control*	DWORD	Varies	Get
	4	Physical Link Object * Structure of Path Size Path	 UINT Array of Word	 Varies Varies	Get
	5	Interface configuration* Structure of IP Address Network Mask Gateway Address Name Server Name Server 2 Domain Name Size Domain Name	 UDINT UDINT UDINT UDINT UDINT UINT STRING	 Varies Varies Varies Varies Varies Varies Varies	Get
	6	Host name* Structure of Host Name Size Host Name	 UINT STRING	 Varies Varies	Get

* For more details on these attributes, see *Volume 2: EtherNet/IP Adaptation of CIP*, Section 5-3.2 from ODVA.

Table 9. TCP Object's Common Services

Service Code	Implemented For		Service Name
	Class Level	Instance Level	
0EHex	Yes	Yes	Get_Attribute_Single
10Hex	No	Yes	Set_Attribute_Single

Ethernet Link Object (EtherNet/IP only) ($F6_{HEX}$ – 1 Instance)

The following tables contain the attribute and common services information for the Ethernet Link Object.

Table 10. TCP Object's Common Services

Instance	Attribute ID	Name	Data Type	Data Value	Access Rule
Class (Instance 0)	1	Revision	UINT	1	Get
Instance 1	1	Interface speed*	UDINT	Varies	Get
	2	Interface flags*	DWORD	Varies	Get
	3	Physical address	USINT Array (6)	Varies	Get

* For more details on these attributes, see *Volume 2: EtherNet/IP Adaptation of CIP*, Section 5-4.2 from ODVA.

Table 11. EtherNet Link Object's Common Services

Service Code	Implemented For		Service Name
	Class Level	Instance Level	
0EHex	Yes	Yes	Get_Attribute_Single

Controller Data Object (64_{HEX} - 1 Instance)

The following tables contain the attribute and common services information for the Controller Data Object.

This data is also available on the web-based configuration.

Table 12. Controller Data Object (64_{HEX} - 1 Instance)

Instance	Attribute ID	Name	Data Type	Data Value	Access Rule	ASCII Response
Class (Instance 0)	1	Revision	UINT	1	Get	
Instance 1	1	Controller Serial Number	SHORT STRING32	Varies	Get	"GCs <Serial Number>\r"
	2	Controller Information Max Emitters	SINT	Varies	Get	"GCI <MaxEmitters>:<Revision>:<UpTime>\r"
	3	Controller Information Revision	SHORT STRING32	Varies	Get	"GCI <MaxEmitters>:<Revision>:<UpTime>\r"
	4	Controller Information Up Time	REAL	Varies	Get	"GCI <MaxEmitters>:<Revision>:<UpTime>\r"

Table 13. Controller Data Object's Common Services

Service Code	Implemented For		Service Name
	Class Level	Instance Level	
0EHex	Yes	Yes	Get_Attribute_Single

Emitter Data Object (65_{HEX} - 8 Instances)

The following tables contain the attribute and common services information for the Emitter Data Object.

Table 14. Emitter Data Object (65_{HEX} - 8 Instances)

Instance	Attribute ID	Name	Data Type	Data Value	Access Rule	ASCII Response
Class (Instance 0)	1	Revision	UINT	1	Get	
Instances 1 - 8	1	Emitter Serial Number	SHORT STRING32	Varies	Get	"GE#s <Serial Number>\r"
	2	Emitter Power Correction	SINT	50 - 120	Get	"GE#p <Power Correction>\r"
	3	Emitter Information Revision	SHORT STRING32	Varies	Get	"GE#I <Revision>:<UpTime>:<OnTime>\r"
	4	Emitter Information Up Time	REAL	Varies	Get	"GE#I <Revision>:<UpTime>:<OnTime>\r"
	5	Emitter Information on Time	Real	Varies	Get	"GE#I <Revision>:<UpTime>:<OnTime>\r"

Table 15. Emitter Data Object's Common Services

Service Code	Implemented For		Service Name
	Class Level	Instance Level	
0EHex	Yes	Yes	Get_Attribute_Single

Dymax Corporation
+1.860.482.1010 | info@dymax.com | www.dymax.com

Dymax Oligomers & Coatings
+1.860.626.7006 | info_oc@dymax.com | www.dymax-oc.com

Dymax Asia (H.K.) Limited
+852.2460.7038 | dymaxasia@dymax.com | www.dymax.com.cn

Dymax Europe GmbH
+49 (0) 611.962.7900 | info_de@dymax.com | www.dymax.de

Dymax UV Adhesives & Equipment (Shanghai) Co. Ltd.
+86.21.37285759 | dymaxasia@dymax.com | www.dymax.com.cn

Dymax Asia Pacific Pte. Ltd.
+65.6752.2887 | info_ap@dymax.com | www.dymax-ap.com

Dymax Engineering Adhesives Ireland Ltd.
+353 21.237.3016 | info_ie@dymax.com | www.dymax.ie

Dymax UV Adhesives & Equipment (Shenzhen) Co. Ltd.
+86.755.83485759 | dymaxasia@dymax.com | www.dymax.com.cn

Dymax Korea LLC
+82.2.784.3434 | info_kr@dymax.com | www.dymax.com/kr