

Huron Net Works

DeviceNet
DN-A102
DN-A102-12

Device Profile

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Rev	Date	Note(s)
1.00	08/03/99	Original
1.01	08/31/99	Corrections
1.02	12/11/06	Added DN-A102-12

1. Object Model

DN-A102 is a DeviceNet interface module for a pneumatic valve manifold with support for a proportional valve. It is designed for use with Rexroth valve manifold models 299 560 018 9 and 299 560 019 0 and Rexroth proportional valve model 561 021 451 0.

1.1 Objects Present in Device

Object	Class Id	Optional/Required	# of Instances
Identity	0x01	Required	1
Message Router	0x02	Optional*	1
DeviceNet	0x03	Required	1
Assembly	0x04	Required	2
Connection	0x05	Required	1 Explicit Messaging 1 Polled I/O
Discrete Input Point	0x08	Required	8
Discrete Output Point	0x09	Required	28
Analog Input Point	0x0A	Optional	1
Analog Output Point	0x0B	Optional	1
Parameter	0x0F	Optional	1
Discrete Output Group	0x1E	Optional	1

* Attributes and services are optional; behavior is required.

1.2 Objects That Effect Behavior

Object	Class Id	Effect on Behavior
Identity	0x01	Supports the Reset Service
Message Router	0x02	No Effect
DeviceNet	0x03	Configures Port Attributes
Assembly #100	0x04	Defines input data format
Assembly #101	0x04	Defines output data format
Connection	0x05	Establishes the number of connections
Discrete Input Point	0x08	Reports state of position sensing inputs
Discrete Output Point	0x09	Defines behavior of solenoid output points
Analog Input Point	0x0A	For EP valve feedback
Analog Output Point	0x0B	For EP valve control
Parameter	0x0F	For Analog percentage calculation
Discrete Output Group	0x1E	Defines Fault and Idle output behavior

1.3 Object Interfaces

Object	Class Id	Interface
Identity	0x01	Message Router
Message Router	0x02	Explicit Message Connection Instance
DeviceNet	0x03	Message Router
Assembly #100	0x04	I/O Connection or Message Router
Assembly #101	0x04	I/O Connection or Message Router
Connection	0x05	Message Router
Discrete Input Point	0x08	I/O Connection or Message Router
Discrete Output Point	0x09	I/O Connection or Message Router
Analog Input Point	0x0A	I/O Connection or Message Router
Analog Output Point	0x0B	I/O Connection or Message Router
Parameter	0x0F	I/O Connection or Message Router
Discrete Output Group	0x1E	I/O Connection or Message Router

1.4 Identification of I/O Assembly Instances (Class 0x04)

Number	Type	Name
100	Input	Device Inputs
101	Output	Device Outputs

1.5 Format of I/O Assembly Data Attribute

1.5.1 Assembly Instance 100 -- Device Inputs

Byte	7	6	5	4	3	2	1	0
0	IN8	IN7	IN6	IN5	IN4	IN3	IN2	IN1
1	Analog Input Value							

IN1 Gun Fully Open
 IN2 Gun Open
 IN3 Water Saver Tripped
 IN4 Tip Dress Advanced
 IN5 Tip Dress Retracted
 IN6 Pressure Achieved *
 IN7 Extra Input A
 IN8 Extra Input B

*IN6 is a calculated value rather than a hardware input point.

IN6 is true when Analog Input Value is greater than a percentage of the Analog Output Value. The percentage value is configurable using the parameter object, and has a default value of 95%.

1.5.2 Assembly Instance 101 -- Device Outputs

Byte	7	6	5	4	3	2	1	0
0	OUT8	OUT7	OUT6	OUT5	OUT4	OUT3	OUT2	OUT1
1	OUT16	OUT15	OUT14	OUT13	OUT12	OUT11	OUT10	OUT9
2	OUT24	OUT23	OUT22	OUT21	OUT20	OUT19	OUT18	OUT17
3	Not Used, Ignore				OUT28	OUT27	OUT26	OUT25
4	Analog Output Value							

* Values in grayed cells are ignored on the DN-A102-12

2. Standard Objects

2.1 Identity Object (Class 0x01)

There is a single instance of the identity object for the device.

2.1.1 Class Attributes (Instance 0)

No class attributes are supported.

2.1.2 Instance Attributes (Instance 1)

Attribute ID	Access Rule	Name	Data Type	Value DN-A102	Value DN-A102-12
1	Get	Vendor	UINT	0x0064	
2	Get	Device Type	UINT	0x0000	
3	Get	Product Code	UINT	0x0004	0x0005
4	Get	Revision	STRUCT	01.01	
5	Get	Status	WORD	0x0000	
6	Get	Serial #	UDINT	0x00000001*	0x00000401*
7	Get	Product Name	STRUCT	10,Dense Pack	10,DN-A102-12
8	Get	State	USINT	[0..5]	

* Base Serial Number

2.1.3 Instance Services

Service Code	Service Name	Description of Service
05	Reset	Invoke reset service (see below)
0E	Get_Attribute_Single	Returns the contents of the specified attribute

2.1.4 Reset Service

Data Type	Value	Description of Service
UINT	0	Reset the device to power up configuration
	1	Return the device to Out-of-Box configuration

2.2 Message Router Object (Class 0x02)

There is no externally visible interface to the Message Router Object.

2.3 DeviceNet Object (Class 0x03)

There is a single instance of the DeviceNet Object for the device

2.3.1 Class Attributes (Instance 0)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Revision	UINT	0x0002

2.3.2 Class Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

2.3.3 Instance Attributes (Instance 1)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	MACID Value	USINT	Range 0-63
2	Get/Set	Baud Rate Value	USINT	Range 0-63
3	Get/Set	BOI	BOOL	0x00 Fault
4	Get/Set	Bus-Off Counter	USINT	0x00
5	Get	Allocation Information	STRUCT	Allocate Service
6	Get	MAC ID Switch Changed	BOOL	0=No Change 1=Changed
7	Get	Baudrate Switch Changed	BOOL	0=No change 1=Changed
8	Get	MAC ID Switch Setting	USINT	Range 0-63
9	Get	Baudrate Switch Setting	USINT	Range 0-3

2.3.4 Instance Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute
10	Set_Attribute_Single	Sets the value of the specified attribute
4B	Allocate	Creates predefined M/S connections
4C	Release	Deletes predefined M/S connections

2.4 Connection Object (0x05)

2.4.1 Class Attributes (Instance 0)

No class Attributes are supported

2.4.2 Instance Attributes

There are three instances of the Connection Object in the device. Instance #1 is assigned to the explicit messaging connection. Instance #2 is assigned to the Polled I/O connection. The tables below show the attributes and the predefined values where applicable.

Explicit Message Connection (Instance #1)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0x03
2	Get	instance_type	USINT	0x00
3	Get	Xport Class Trigger	USINT	0x83
4	Get	Produced connection ID	UINT	0x5FB for MAC ID 63
5	Get	Consumed connection ID	UINT	0x5FC for MAC ID 63
6	Get	initial comm characteristics	USINT	0x21
7	Get	Produced Connection size	UINT	0x001C
8	Get	Consumed connection size	UINT	0x001C
9	Get/Set	Expected packet rate	UINT	Application Dependent
10	N/A	N/A	N/A	Not Used
11	N/A	N/A	N/A	Not Used
12	Get	Watchdog timeout action	USINT	0x01 Auto Delete
13	Get	Produced path length	UINT	0x0000
14	Get	produced path	Array of USINT	<NULL>
15	Get	Consumed path length	UINT	0x0000
16	Get	consumed path	Array of USINT	<NULL>
17	Get	production inhibit timer	UINT	0x0000*

* Server devices do not use this timer

Poll I/O Message Connection (Instance #2)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0x03
2	Get	instance_type	USINT	0x01
3	Get	Xport Class Trigger	USINT	0x82 Poll/COS/Cyc (0x80 COS/Cyc, no ACK)
4	Get	Produced connection ID	UINT	0x3FF for MAC ID 63 (0xFFFF no ACK)
5	Get	consumed connection ID	UINT	0x5FD for MAC ID 63
6	Get	initial comm characteristics	USINT	0x01 0xF1 no Poll no Ack
7	Get	produced connection size	UINT	0x0002 0 for no Poll
8	Get	consumed connection size	UINT	0x0005
9	Get/Set	expected packet rate	UINT	Application Dependent
10	N/A	N/A	N/A	Not Used
11	N/A	N/A	N/A	Not Used
12	Get	watchdog timeout action	USINT	0x00 Time Out
13	Get	produced path length	UINT	0x0006
14	Get	produced path	Array of USINT	20.04.24.64.30.03 <null> no poll
15	Get	consumed path length	UINT	0x0006
16	Get	consumed path	Array of USINT	20.04.24.65.30.03
17	Get	production inhibit timer	UINT	0x0000*

* Server devices do not use this timer

2.4.3 Instance Services

Service Code	Service Name	Description of Service
05	Reset	Reset the connection, restart timer, transition from timed out state.
0E	Get_Attribute_Single	Returns the contents of the specified attribute
10	Set_Attribute_Single	Sets the value of the specified attribute

2.5 Discrete Input(0x08)

2.5.1 Class Attributes

Attribute ID	Access Rule	Name	Data Type	Description	Value
1	Get	Revision	UINT	Revision of this object	2

2.5.2 Class Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

2.5.3 Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	BOOL	Input Point Value	0=off 1=on

2.5.4 Instance Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

2.5.5 Discrete Input Signal Mapping

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
IN1	Gun Fully Open	8	1	Value	3
IN2	Gun Open	8	2	Value	3
IN3	Water Saver Tripped	8	3	Value	3
IN4	Tip Dress Advanced	8	4	Value	3
IN5	Tip Dress Retracted	8	5	Value	3
IN6*	Pressure Achieved	8	6	Value*	3
IN7	Extra In A	8	7	Value	3
IN8	Extra In B	8	8	Value	3

*IN6 is a calculated value rather than a hardware input point.

IN6 is true when Analog Input Value is greater than a percentage of the Analog Output Value. The percentage value is configurable using the parameter object, and has a default value of 95%.

2.6 Discrete Output (0x09)

2.6.1 Class Attributes

No class attributes are supported for this class.

2.6.2 Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get/Set	Value	BOOL	Output Point Value	0=off 1=on

2.6.3 Instance Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute
10	Set_Attribute_Single	Modifies an attribute value

2.6.4 Discrete Output Signal Mapping

Data Name	Class		Instance Number	Attribute	
	Name	Number		Name	Number
OUT1	Discrete Out	9	1	Value	3
OUT2	Discrete Out	9	2	Value	3
OUT3	Discrete Out	9	3	Value	3
OUT4	Discrete Out	9	4	Value	3
OUT5	Discrete Out	9	5	Value	3
OUT6	Discrete Out	9	6	Value	3
OUT7	Discrete Out	9	7	Value	3
OUT8	Discrete Out	9	8	Value	3
OUT9	Discrete Out	9	9	Value	3
OUT10	Discrete Out	9	10	Value	3
OUT11	Discrete Out	9	11	Value	3
OUT12	Discrete Out	9	12	Value	3
OUT13	Discrete Out	9	13	Value	3
OUT14	Discrete Out	9	14	Value	3
OUT15	Discrete Out	9	15	Value	3
OUT16	Discrete Out	9	16	Value	3
OUT17	Discrete Out	9	17	Value	3
OUT18	Discrete Out	9	18	Value	3
OUT19	Discrete Out	9	19	Value	3
OUT20	Discrete Out	9	20	Value	3
OUT21	Discrete Out	9	21	Value	3
OUT22	Discrete Out	9	22	Value	3
OUT23	Discrete Out	9	23	Value	3
OUT24	Discrete Out	9	24	Value	3
OUT25	Discrete Out	9	25	Value	3
OUT26	Discrete Out	9	26	Value	3
OUT27	Discrete Out	9	27	Value	3
OUT28	Discrete Out	9	28	Value	3

* Object instances in grayed cells are present in the object model, but no physical outputs exist for these in the DN-A102-12

2.7 Analog Input Object (class 0x0A)

2.7.1 Class Attribute

Attribute ID	Access Rule	Name	Data Type	Description	Value
1	Get	Revision	UINT	Revision of this object	2

2.7.2 Class Service

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

2.7.3 Instance Attributes (Instance 1)

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get	Value	USINT	Analog Input value	0-255
8	Get	Value Data Type	USINT	Data Type of Attribute 3	2 USINT

2.7.4 Instance Service

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute

2.8 Analog Output Object (class 0x0B)

2.8.1 Class Attributes

No class attributes are supported for this class.

2.8.2 Instance Attributes (Instance 1)

Attribute ID	Access Rule	Name	Data Type	Description	Value
3	Get/Set	Value	USINT	Analog Output Value	0-255
8	Get	Value Data Type	USINT	Data Type of Attribute 3	2 USINT

2.8.3 Instance Service

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute
10	Set_Attribute_Single	Modifies an attribute value

2.9 Parameter Object (class 0x0F)

2.9.1 Class Attribute

Attribute ID	Access Rule	Name	Data Type	Description	Value
2	Get	Max Instance	UINT	Largest instance number of this object	1
8	Get	Parameter Class Descriptor	WORD	Support Full Attributes	1
9	Get	Config Assy	UINT	Configuration Assembly Instance not supported	0

2.9.2 Class Service

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute

2.9.3 Instance Attributes (Instance 1)

Attribute ID	Access Rule	Name	Data Type	Description	Value
1	Get/Set	Value	USINT	Percent of Analog Output Value (Expressed as N/256)	0-255, Default = 243 (95%)
2	Get	Link Path Size	USINT	No link is specified	0
3	Get	Link Path		No link is specified	<null>
4	Get	Descriptor	WORD	No link is specified	0
5	Get	Data Type	USINT	Value is USINT	8
6	Get	Data Size	USINT	Number of Bytes in Value	1

2.9.4 Instance Service

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified Attribute
10	Set_Attribute_Single	Modifies an attribute value

2.10 Discrete Output Group (class 0x1E)

2.10.1 Class Attributes

No class attributes are supported for this class

2.10.2 Instance Attributes

Attribute ID	Access Rule	Name	Data Type	Description	Value
6	Get/Set	Command	BOOL	Change State of all DOPs to Idle or Ready	0=Idle 1=Ready
7	Get/Set	Fault State	BOOL	State of output after fault	0=Fault Value 1=Hold Last State
8	Get/Set	Fault Value	BOOL	User Defined Fault Value	0,1
9	Get/Set	Idle State	BOOL	State of output during Idle	0=Idle Value 1= Hold Last State
10	Get/Set	Idle Value	BOOL	User Defined Idle Value	0,1

2.10.3 Instance Services

Service Code	Service Name	Description of Service
0E	Get_Attribute_Single	Returns the contents of the specified attribute
10	Set_Attribute_Single	Modifies an attribute value