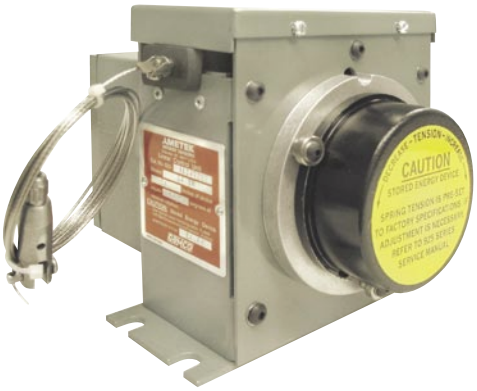
GEMCO®

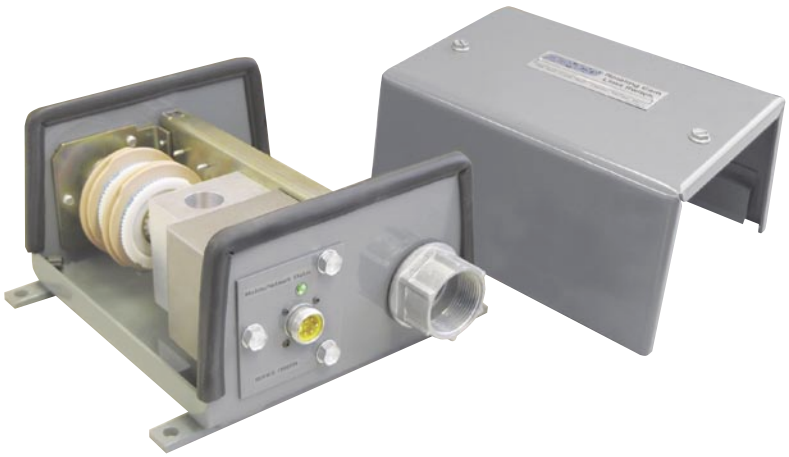
INSTRUCTION MANUAL

DeviceNet

Resolver Based Products

This manual covers 1986DN, 1980DN, 1990DN and 925DN units with built in resolvers.





ODVA™
Networks Built on a Common Industrial Protocol

DeviceNet™
CONFORMANCE TESTED

AMETEK®
AUTOMATION & PROCESS TECHNOLOGIES

Contents

This manual will instruct the user in programming the GEMCO DeviceNet Resolver based products. It is intended to cover the DeviceNet Resolver related items only. Other, product specific, information may be available in separate literature shipped with the product.

Ametek has checked the accuracy of this manual at the time it was printed. Any comments you may have for the improvement of this manual are welcomed.

Chapter 1: Overview

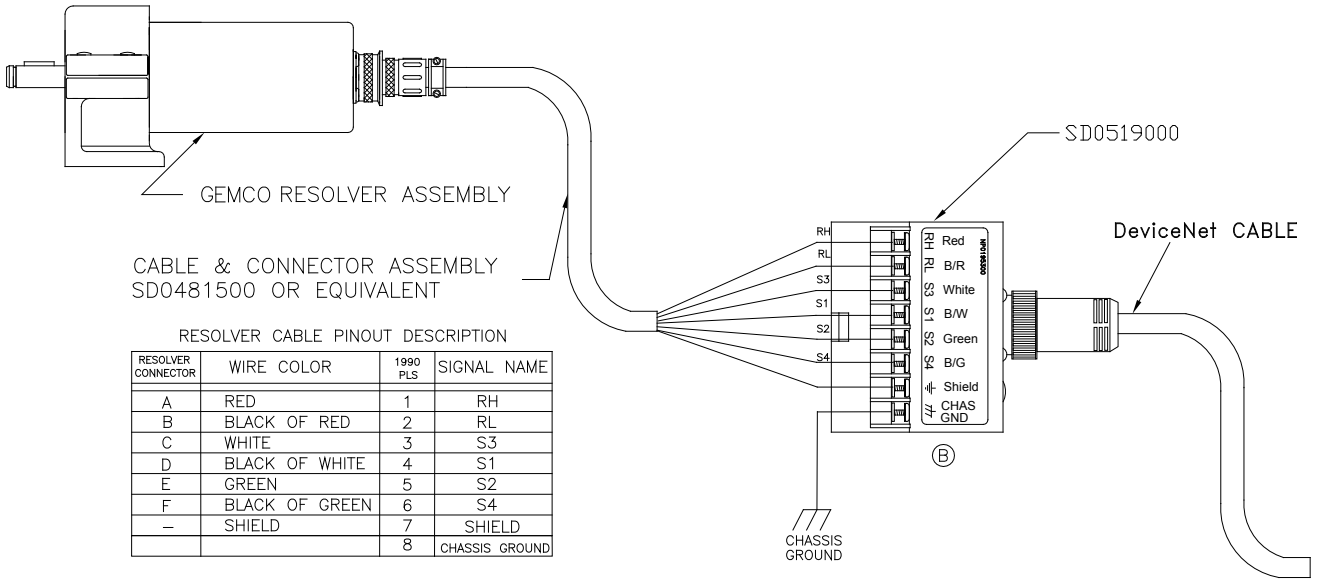
The DeviceNet Resolver combines the reliability and resolution of continuous resolver position sensing with the added flexibility of DeviceNet communications. The resolver technology is the same as other GEMCO resolvers which have been proven in rugged applications like stamping press automation. The rugged housing construction is ideal for harsh industrial environments. All embedded electronics are SMT constructed for the ultimate reliability.

The DeviceNet Resolver plugs in, as a node on any control system with a DeviceNet Scanner. Additional resolvers are added by simply plugging into the network. Continuous rotary positions data with 12-Bit resolution is provided. In addition, eight (8) built-in user programmable setpoints are transmitted over the network thus allowing direct control of critical functions. All programming is done over the DeviceNet network.

The DeviceNet Resolver provides flexibility and cost savings when compared to other methods of continuous position sensing. Each encoder is easy to mount and wire using mini-change plug connectors and avoiding cumbersome traditional resolver cables. Since every DeviceNet network is bus powered, there is no need for a separate power supply. There are no port concentrators to buy since all of the sensing and network electronics are embedded within the resolver housing. The DeviceNet Resolver and DeviceNet scanner card are competitively priced with a plain resolver and PLC resolver input card. Additional DeviceNet Resolver units can be added on the same DeviceNet network without adding additional scanner cards. This approach is very useful when more than one resolver per system is needed.

By using the DeviceNet Resolver it's possible to eliminate stand alone programmable limit switches and other added electronic modules. This means savings on equipment and installation with the added benefits of improved reliability and productivity.

1990DN Wiring Diagram



RESOLVER CABLE PINOUT DESCRIPTION

RESOLVER CONNECTOR	WIRE COLOR	1990 PLS	SIGNAL NAME
A	RED	1	RH
B	BLACK OF RED	2	RL
C	WHITE	3	S3
D	BLACK OF WHITE	4	S1
E	GREEN	5	S2
F	BLACK OF GREEN	6	S4
–	SHIELD	7	SHIELD
		8	CHASSIS GROUND

Chapter 2: DeviceNet Information

The DeviceNet Resolver operates as a “Group 2 only slave” device. It operates as an input only device on the DeviceNet network. All device configurations are accomplished by using any DeviceNet software configuration tool.

The DeviceNet Resolver is capable of communicating at all three DeviceNet baud rates, 125K, 250K, and 500K. The node address can be set to any address, 0 - 63. There are several parameters: scale factor, counting direction, and 8 programmable setpoint that are configured or modified by the user through the Parameter Object. (See section 4.0: DeviceNet Resolver Object Model).

2.1: LED Operation

The DeviceNet Resolver is equipped with a Network Status LED. The network Status LED operates as follows:

Solid Green = Allocated by Master
Flashing Green = Passed Duplicate MAC ID Test and is awaiting to be allocated by Master
Solid Red = Fatal error. Requires user intervention. Check for duplicate MAC ID or baud rate communication rate setting.

2.2: I/O Messaging

The DeviceNet Resolver supports Bit-Strobe Message Connection as well as a Polled I/O Message connection. The DeviceNet Resolver does **not** support Cyclic I/O or Change-of-State Message Connections.

Bit Strobe Message
A bit strobed message connection is a very fast method by which a master sends one bit (Bit Strobe Command) out on the network and receives up to 8 bytes of data (Bit Strobe Response) from each slave device that supports a Bit Strobe Message Connection. The DeviceNet Resolver disregards the command message. No user-defined configuration is required.

Polled I/O Message
A polled message connection is used for devices that have inputs and outputs. It can also be used for “Input Only” devices. The master sends out a Polled Command to each individual device and the device responds with an 8 byte Polled Response. The Polled message connection is not the most efficient message connection to use for “Input Only” devices because there is a Command message sent to and a Response message sent from each device. This creates a lot of unnecessary network traffic.

2.3: Data Format

The setpoint status is supplied in the first 8 bits of the I/O message. One bit for each setpoint, “0 = off” and “1 = on”. The next 16 bits will provide the scaled resolver position information **(4095 maximum)**. And finally, the next 16 bits will provide the RPM data **(1024 maximum)**. The entire I/O message is 40 bits long. You will need to reserve 40 bits in your controller I/O image table.

Setpoint Data								Position Data							
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Position Data								RPM Data							
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
RPM Data								Not Used							
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Not Used															
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63

Chapter 3: Getting Started

3.1: Establishing DeviceNet Communications

NOTE: This manual assumes that the network is configured in accordance with the DeviceNet wiring specification.

1. Remove the DeviceNet Resolver from the box and connect your DeviceNet cable to the 5-pin mini connector on the back of the resolver according to the DeviceNet wiring specifications.

2. Make sure that there is power on the DeviceNet network when you connect the DeviceNet Resolver to the network.

3. The DeviceNet Resolver will undergo an initialization sequence, flashing the network status LED. The LED will first turn green then red and then flash green. At this point, the DeviceNet Resolver has passed its duplicate MAC ID test and is ready to be allocated by a master.

4. If the network status LED stays solid red, remove the DeviceNet Resolver from the network and then reconnect. If the LED is still solid red, then go to section 3.2: Configure the Node Address and Baud Rate.

3.2: Configure the Node Address and Baud Rate

1. When the network status is flashing green you may change the device node address (MAC ID) and the baud rate using any DeviceNet software configuration tool. Defaults are node address 63 and 125K baud.

2. If you change the node address, the DeviceNet Resolver will undergo the initialization sequence and assume the new node address.

3. If you change the baud rate, the new baud rate will not take effect until power is cycled to the DeviceNet Resolver and the initialization sequence occurs.

4. Confirm the new node address and baud rate are set correctly by using the software configuration tool to scan the network for the DeviceNet Resolver.

3.3: Parameter Configuration

After the baud rate and node address have been established, the device parameters are ready to be configured. The parameters must be configured in the following sequence:

3.3.1: Scale Factor

The scale factor range is from 2 to 4096. The scale factor can not exceed 4096. The scale factor is configured through the Parameter Object. The default scale factor is 4096.

NOTE: Changing the scale factor will result in clearing the position offset and resetting all of the setpoint values to zero. Therefore, the scale factor should be set prior to configuring any setpoints or position offset.

Set Parameter Instance 2 Attribute ID 1 Desired Value. Desired Value = 2 to 4096.

3.3.2: Counting Direction

The DeviceNet Resolver can be configured to count (increment) in either direction. The default direction is clockwise.

Set Parameter Instance 3 Attribute ID 1 Desired Value. Desired Value = 0 for clockwise, 1 for counter clockwise.

3.3.3: Position Offset

The indicated position of the resolver can be changed to synchronize or “zero” the resolver to the machine it is attached to. The resolver position can be changed by moving the resolver at the desired position and writing the desired indicated position to attribute 1 of the Position Object. All setpoints will be based on this offset position. A valid position value can range between, and include, zero and the scale factor. (i.e. 0 ≤ position < scale factor).

3.3.4: Setpoints

As indicated the DeviceNet Resolver has 8 programmable setpoints. Each setpoint is individually programmed through the Parameter Object. Each setpoint has an “On Position” value and an “Off Position” value. All setpoint defaults are set to 0. **Each setpoint has only one “On” and one “Off” per revolution.**

NOTE: The setpoints can be changed after the scale factor has been established. The setpoints cannot be configured outside the scale factor range.

Setpoint 1 “On” Position	Set **Parameter Instance 5 Attribute ID 1** Desired On Position Value
Setpoint 1 “Off” Position	Set **Parameter Instance 6 Attribute ID 1** Desired Off Position Value
Setpoint 2 “On” Position	Set **Parameter Instance 7 Attribute ID 1** Desired On Position Value
Setpoint 2 “Off” Position	Set **Parameter Instance 8 Attribute ID 1** Desired Off Position Value
Setpoint 3 “On” Position	Set **Parameter Instance 9 Attribute ID 1** Desired On Position Value
Setpoint 3 “Off” Position	Set **Parameter Instance 10 Attribute ID 1** Desired Off Position Value
Setpoint 4 “On” Position	Set **Parameter Instance 11 Attribute ID 1** Desired On Position Value
Setpoint 4 “Off” Position	Set **Parameter Instance 12 Attribute ID 1** Desired Off Position Value
Setpoint 5 “On” Position	Set **Parameter Instance 13 Attribute ID 1** Desired On Position Value
Setpoint 5 “Off” Position	Set **Parameter Instance 14 Attribute ID 1** Desired Off Position Value
Setpoint 6 “On” Position	Set **Parameter Instance 15 Attribute ID 1** Desired On Position Value
Setpoint 6 “Off” Position	Set **Parameter Instance 16 Attribute ID 1** Desired Off Position Value
Setpoint 7 “On” Position	Set **Parameter Instance 17 Attribute ID 1** Desired On Position Value
Setpoint 7 “Off” Position	Set **Parameter Instance 18 Attribute ID 1** Desired Off Position Value
Setpoint 8 “On” Position	Set **Parameter Instance 19 Attribute ID 1** Desired On Position Value
Setpoint 8 “Off” Position	Set **Parameter Instance 20 Attribute ID 1** Desired Off Position Value

Chapter 4: DeviceNet Object Model

4.1: Object Model

4.1.1: Objects Present in the DeviceNet Resolver

Object	Optional/ Required	# of Instances
Identity (1)	Required	1
Message Router (2)	Required	1
DeviceNet (3)	Required	1
Assembly (4)	Required	1
Connection (5)	Required	3
Parameter (15)	Required	20
Position (100)	Required	1
Setpoint (101)	Required	8
RPM (102)	Required	1

4.1.2: Objects That Effect Behavior

Object	Effect on Behavior
Identity (1)	Supports the Reset Service
Message Router (2)	No Effect
DeviceNet (3)	Configures Port Attributes
Assembly #1 (4)	I/O Assembly
Assembly #2 (4)	Config Assembly
Connection (5)	Establishes the number of connections
Position (100)	Configures the position offset
Setpoint (101)	Configures the setpoint positions
RPM (102)	No Effect

4.1.3: Object Interfaces

Object	Interface
Identity (1)	Message Router
Message Router (2)	Explicit Message Connection Instance
DeviceNet (3)	Message Router
Assembly #1 (4)	I/O Connection or Message Router
Assembly #2 (4)	Message Router
Connection (5)	Message Router
Position (100)	Message Router
Setpoint (101)	Message Router
RPM (102)	Message Router

4.1.4: Identification of I/O Assembly Instances

Instance Number	Type	Name
1	Input	Position Data/Setpoint Status/ RPM Value
2	Input	Setpoint Data

4.1.5: Format of I/O Assembly Data Attribute

Assembly #1 - I/O Assembly								
Byte	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	Setpoint Status							
1	Position Low							
2	Position High							
3	RPM Low							
4	RPM High							

Assembly #2 - Config Assembly	
Byte	
0	Setpoint 1 On Position (Low Byte)
1	Setpoint 1 On Position (High Byte)
2	Setpoint 1 Off Position (Low Byte)
3	Setpoint 1 Off Position (High Byte)
4	Setpoint 2 On Position (Low Byte)
5	Setpoint 2 On Position (High Byte)
6	Setpoint 2 Off Position (Low Byte)
7	Setpoint 2 Off Position (High Byte)
8	Setpoint 3 On Position (Low Byte)
9	Setpoint 3 On Position (High Byte)
10	Setpoint 3 Off Position (Low Byte)
11	Setpoint 3 Off Position (High Byte)
12	Setpoint 4 On Position (Low Byte)
13	Setpoint 4 On Position (High Byte)
14	Setpoint 4 Off Position (Low Byte)
15	Setpoint 4 Off Position (High Byte)
16	Setpoint 5 On Position (Low Byte)
17	Setpoint 5 On Position (High Byte)
18	Setpoint 5 Off Position (Low Byte)
19	Setpoint 5 Off Position (High Byte)
20	Setpoint 6 On Position (Low Byte)
21	Setpoint 6 On Position (High Byte)
22	Setpoint 6 Off Position (Low Byte)
23	Setpoint 6 Off Position (High Byte)
24	Setpoint 7 On Position (Low Byte)
25	Setpoint 7 On Position (High Byte)
26	Setpoint 7 Off Position (Low Byte)
27	Setpoint 7 Off Position (High Byte)
28	Setpoint 8 On Position (Low Byte)
29	Setpoint 8 On Position (High Byte)
30	Setpoint 8 Off Position (Low Byte)
31	Setpoint 8 Off Position (High Byte)

4.2: Standard Objects

4.2.1: Identity Object (Class ID = 1)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Vendor	UNIT	0x009C
2	Get	Product Type	UINT	0x0000
3	Get	Product Cod	UINT	0x07C2
4	Get	Revision	STRUCT	01.00
5	Get	Status	WORD	0x0000
6	Get	Serial #	UDINT	0x00000001
7	Get	Product Name	STRUCT	15, “1986DN Resolver”

4.2.2: Message Router Object (Class ID = 2)

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

4.2.3: DeviceNet Object (Class ID = 3)

There is a single instance of the DeviceNet Object for the DeviceNet Resolver. No class attributes are supported.

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	MACID	USINT	0x63
2	Get/Set	Baud Rate	USINT	125K
3	Get/Set	BOI	BOOL	0x00 Hold in Reset
4	Get/Set	Bus-off Counter	USINT	0x00
5	Get	Allocation Information	STRUCT	Allocate Service

4.2.4: Connection Object (Class ID = 5)

There are three instances of the connection object. Instance #1 is assigned to the explicit messaging connection. Instance #2 is assigned to the Polled I/O connection. Instance #3 is assigned to the bit-strobe I/O connection.

Explicit Message Connection Object (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	0x0025
8	Get	consumed connection size	UINT	0x0025
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
13	Get	Produced path length	UINT	0x0000
14	Get	Produced path	Array of USINT	0x20 0x04 0x24 0x01 0x30 0x03
15	Get	consumed path length	UINT	0x0000
16	Get	consumed path	Array of USINT	<NULL>

Poll I/O Message Connection Object (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
4	Get	Produced connection ID	UINT	0x3FF for MAC ID 63
5	Get	consumed connection ID	UINT	0x5FD for MAC ID 63
6	Get	initial comm characteristics	USINT	0x01
7	Get	produced connection size	UINT	0x0005
8	Get	consumed connection size	UINT	0x0000
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
13	Get	Produced path length	UINT	0x0006
14	Get	Produced path	Array of USINT	0x20 0x04 0x24 0x01 0x30 0x03
15	Get	consumed path length	UINT	0x0000
16	Get	consumed path	Array of USINT	<NULL>

Bit Strobe I/O Message Connection Object (Instance #3)

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
4	Get	Produced connection ID	UINT	0x3BF for MAC ID 63
5	Get	consumed connection ID	UINT	0x408 for MAC ID 1
6	Get	initial comm characteristics	USINT	0x02
7	Get	produced connection size	UINT	0x0005
8	Get	consumed connection size	UINT	0x0008
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
13	Get	Produced path length	UINT	0x0006
14	Get	Produced path	Array of USINT	0x20 0x04 0x24 0x01 0x30 0x03
15	Get	consumed path length	UINT	0x0000
16	Get	consumed path	Array of USINT	<NULL>

4.2.5: Parameter Object (Class ID = 15)

The parameter object supports the class attributes and 20 instances.

Class Attributes

Attribute ID	Access Rule	Name	Data Type	Value
2	Get	Max Instance	UINT	0x0014
8	Get	Parameter Class Descriptor	WORD	0x0009
9	Get	Configuration Assembly Instance	UINT	0x0002

Parameter Instance #1 (Position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Parameter Value	UINT	Current Position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x64 0x24 0x01 0x30 0x01”
4	Get	Descriptor	WORD	0x0030
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #2 (Scale Factor)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	UINT	Current Scale Factor
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x64 0x24 0x01 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #3 (Direction)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Current Direction
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x64 0x24 0x01 0x30 0x03”
4	Get	Descriptor	WORD	0x0002
5	Get	Data Type	USINT	0x08
6	Get	Data Size	USINT	0x01

Parameter Instance #4 (RPM)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Parameter Value	USINT	Current RPM Value
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x66 0x24 0x01 0x30 0x01”
4	Get	Descriptor	WORD	0x0030
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Spec Tech Industrial Electric www.spectechind.com 888-773-2832

Parameter Instance #5 (Setpoint 1 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 1 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x01 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #6 (Setpoint 1 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 1 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x01 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #7 (Setpoint 2 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 2 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x02 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #8 (Setpoint 2 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 2 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x02 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

GEMCO®

Parameter Instance #9 (Setpoint 3 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 3 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x03 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #10 (Setpoint 3 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 3 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x03 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #11 (Setpoint 4 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 4 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x04 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #12 (Setpoint 4 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 4 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x04 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #13 (Setpoint 5 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 5 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x05 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #14 (Setpoint 5 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 5 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x05 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #15 (Setpoint 6 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 6 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x06 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #16 (Setpoint 6 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 6 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x06 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

GEMCO®

Parameter Instance #17 (Setpoint 7 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 7 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x07 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #18 (Setpoint 7 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 7 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x07 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #19 (Setpoint 8 on position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 8 on position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x08 0x30 0x02”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

Parameter Instance #20 (Setpoint 8 off position)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Parameter Value	USINT	Setpoint 8 off position
2	Get	Link Path Size	USINT	0x06
3	Get	Link Path	ARRAY	“0x20 0x65 0x24 0x08 0x30 0x03”
4	Get	Descriptor	WORD	0x0000
5	Get	Data Type	USINT	0x02
6	Get	Data Size	USINT	0x02

4.3: Application Specific Objects

4.3.1: Position Object (Class ID = 100)

There is a single instance of the position object for the DeviceNet Resolver. No class attributes are supported. All the instances are gettable and settable. The table below shows the values:

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Magnet Position	UINT	Current Position
2	Get/Set	Scale Factor	UINT	Current Scale Factor
3	Get/Set	Direction	USING	Current Direction

Valid position values range from 0 to the current scale factor. Valid scale factor values range from 2 to 4096. Direction value 0 indicates that the counts will increase clockwise. Direction value 1 indicates that the counts will increase counter-clockwise.

4.3.2: Setpoint Object (Class ID = 101)

There are eight instances of the setpoint object in the DeviceNet Resolver. No class attributes are supported. All setpoint position data is gettable and settable. The setpoint status is gettable.

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	Setpoint Status	BOOL	0x00
2	Get/Set	Setpoint On Position	UINT	0x0000
3	Get/Set	Setpoint Off Position	UINT	0x0000

Valid setpoint values range between, and include, zero and the scale factor.
(i.e. $\leq$ setpoint < scale factor)

4.3.3: RPM Object (Class ID = 102)

There is a single instance of the RPM object for the DeviceNet Resolver. No class attributes are supported. All the instances are gettable but not settable. The table below shows the values:

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	RPM	UINT	Current RPM Value

GEMCO®

4.4: Configuration Notes

Network Baud Rate	
DeviceNet Resolver Node Address	
Scale Factor	
Counting Direction	
Setpoint 1 “On”	
Setpoint 1 “Off”	
Setpoint 2 “On”	
Setpoint 2 “Off”	
Setpoint 3 “On”	
Setpoint 3 “Off”	
Setpoint 4 “On”	
Setpoint 4 “Off”	
Setpoint 5 “On”	
Setpoint 5 “Off”	
Setpoint 6 “On”	
Setpoint 6 “Off”	
Setpoint 7 “On”	
Setpoint 7 “Off”	
Setpoint 8 “On”	
Setpoint 8 “Off”	

Appendix

Specifications	
Resolver	
Resolution	12 bit resolution (4096 counts)
RPM	1024 max.
DeviceNet	
Conformance	This product has been tested by ODVA's authorized Independent Test Lab and found to comply with ODVA Conformance Test Software Version A-12.
Power Requirements Inrush	92mA @ 11Vdc typical 67mA @ 24Vdc typical 350mA @ 11Vdc for 20 ms 450mA @ 25Vdc for 10 ms
Device Type	"Generic"
Communications	Group 2 slave only
Messages supported	Polled, Bit Strobed, Explicit
Baud Rates	125K, 250K, 500K
Data Update Rate Position Rate RPM	 915µs 29.29 ms
Scale Factor	2 to 4096
Position Range	0 to 1 less than scale factor
Setpoints	Separate ON and OFF points for each setpoint
Quantity	8
Range	0 to 1 less than scale factor
Approvals	CE
Environmental	
Temperature Operating Storage	 -20°C to +70°C -40°C to +85°C

EMC Specifications

Specifications and Related Documents

The DeviceNet Resolver was tested to and complied with the limits of the following specifications:

EN50081-1:1992 EN55011/A:1999	EMC, Generic emission standard, Light Industrial Limits and methods of measurement of radio characteristics of industrial, scientific and medical (ISM) Radio Frequency equipment, Class B, Group 1.
EN50082-2:1995 EN61000-4-2:1995 EN61000-4-3:1998 + Amendment 1 EN61000-4-4:1995 ENV50144:1993	Generic immunity standard, Industrial ESD Immunity, Performance Criteria B. Radiated RF Immunity, Performance Criteria A. Electrical Fast Transient Immunity, Performance Criteria B. Conducted RF Immunity, Performance Criteria A.
EN61010-1:1993	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.

NOTE: To meet EMC requirements, add Ferrite (Fair-Rite Corporation P/N: 0444167281) to resolver cable located adjacent to DeviceNet connector.

GEMCO®

Other Products

B/W Controls™
LIQUID LEVEL TECHNOLOGY

GEMCO
INDUSTRIAL BRAKES

GEMCO
- LINEAR DISPLACEMENT TRANSDUCERS
- PLC INTERFACE PRODUCTS
- ROTARY POSITION PRODUCTS
- PROGRAMMABLE LIMIT SWITCHES
- EXTREME DUTY CABLE REEL PRODUCTS
- ROTARY LIMIT SWITCHES
- RESOLVERS
- MILL DUTY ENCLOSURES
- ULTRA HIGH SPEED PLS
- SAFETY PRODUCTS

CATRAC®
HEAVY DUTY CABLE AND HOSE CARRIERS

Made In America

AMETEK®
AUTOMATION & PROCESS TECHNOLOGIES

1080 N. Crooks Road, Clawson, MI 48017-1097
Phone 248-435-0700 Toll Free 800-635-0289
Fax 248-435-8120 www.ametekapt.com

DNRES.M3R
3/07.Z35