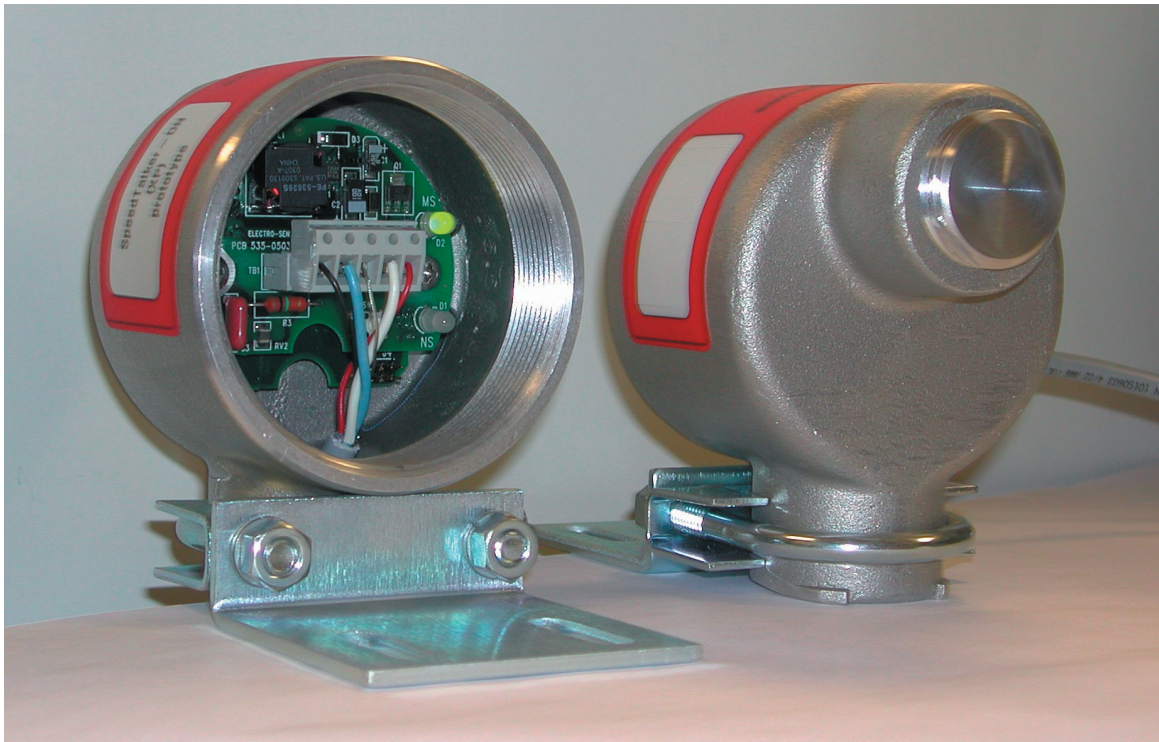




SpeedTalker-DN (XP)

DeviceNet Shaft Speed Sensor with Alarms

USER'S MANUAL



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990-002300 Revision B

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1. Overview

The SpeedTalker-DN (XP) continuously monitors rotating shaft speed, providing measured RPM and the status of up to four alarm functions over DeviceNet.

Measurable speed ranges from 0.0 to 6,553.5 RPM. Each configurable alarm function has on/off, overspeed/underspeed, speed threshold, delay time and minimum on-time settings.

All configuration is handled over DeviceNet with parameter settings stored in non-volatile memory. An electronic data sheet file (EDS) is provided to aid configuration.

Speed measurement and alarm status are provided over the Poll I/O connection. Alarm status is also provided over the COS I/O connection for applications requiring sensor-initiated underspeed and/or overspeed notification (e.g. 'zero-speed' sensing).

2. Operation

2.1 Indicator LEDs

The Network Status and Module Status indicators are located inside the enclosure (remove round cover to view them). They are provided to aid setup, diagnostics and troubleshooting. Their operation is standard DeviceNet.

LED state	Network Status (NS)	Module Status (MS)
Off	Not powered / not on-line	Not powered
Flashing Green	On-line, not connected	Device Standby
Green	On-line, connected	Device Operational
Flashing Red	IO connection timed-out	Minor Fault
Red	Comm fault	Unrecoverable Fault
Flashing Red/Green		Device Self-Testing

2.2 Speed measurement

SpeedTalker-DN (XP) detects alternating magnetic pulses from a shaft-mounted rotating Pulser Disk or Pulser Wrap and converts the pulse frequency into measured speed (RPM) units. The RPM value is given in the Measured Speed attribute of the Speed object and is also part of the Assembly object's Data attribute (Poll I/O connection). See the Device Profile for details.

The Measured Speed is governed by two configuration parameters:

Target Pulses/Rev (PPR)

Set this to the pulses per revolution of the Pulser Disk/Wrap used.

Note that the Target PPR is *one-half* the number of Pulser Disk/Wrap magnets.

Minimum measurable speed

Sets the minimum shaft speed (RPM) below which the *measured* RPM will be zero. This is particularly useful in slower speed applications to reduce the time taken to detect zero RPM.

2.3 Alarm functions

Four configurable alarm functions (Alarm 4...1) are provided for detecting underspeed or overspeed conditions. Each may be used individually or in any combination with the others. All have identical capabilities and each works independently of the others.

The states (Alarmed/Not-Alarmed) of the four alarm functions are given in the low four bits of the Alarm Status attribute of the Alarm object and is part of the Assembly object's Data attribute (Poll I/O connection).

Alarm Status is also available over the COS I/O connection for applications requiring sensor-initiated underspeed and/or overspeed notification. See the Device Profile for details.

The following three configuration parameters apply to *all four* alarm functions:

Alarm 4...1 ON/OFF

The low four bits of this parameter selectively turn the alarm functions ON/OFF.

Alarm 4...1 Over/Under

The low four bits of this parameter set alarm overspeed/underspeed functionality for the alarm functions. When set for overspeed, a function becomes alarmed when measured speed is *greater than* the Overspeed Alarmed trip-point and becomes not-alarmed when it is *less than* the Not-Alarmed trip-point. When set for underspeed, a function becomes alarmed when measured speed is *less than* the Underspeed Alarmed trip-point and becomes not-alarmed when it is *greater than* the Not-Alarmed trip-point.

Alarm threshold hysteresis

Works with each function's Alarm Threshold and Over/Under setting to determine the RPM trip-point for *exiting* the Alarmed state. It has no effect on the RPM trip-point for *entering* the Alarmed state.

Over/Underspeed Alarmed trip-point: Alarm Threshold

Overspeed Not-Alarmed trip-point: $(1 - \%Hysteresis/100) * \text{Alarm Threshold}$

Underspeed Not-Alarmed trip-point: $(1 + \%Hysteresis/100) * \text{Alarm Threshold}$

Example for %Hysteresis = 1%, Alarm Threshold = 100.0 RPM, Overspeed:

Alarmed trip-point = 100 RPM, Not-Alarmed trip-point = 99.0 RPM

Each alarm function has the following configuration parameters:

Alarm threshold

Sets the RPM trip-point for *entering* the Alarmed state. Also works with the Alarm threshold hysteresis and the function's Over/Under setting to determine the RPM trip-point for *exiting* the Alarmed state.

Over/Underspeed Alarmed trip-point: Alarm Threshold

Overspeed Not-Alarmed trip-point: $(1 - \%Hysteresis/100) * \text{Alarm Threshold}$

Underspeed Not-Alarmed trip-point: $(1 + \%Hysteresis/100) * \text{Alarm Threshold}$

Alarm ON delay

Sets the time that measured speed must be continuously at alarm levels before the function enters the Alarmed state. This setting is useful for avoiding nuisance alarms resulting from transient speed excursions into alarm levels.

Alarm ON minimum time

Sets the minimum time a function stays Alarmed once it has entered the Alarmed state.

3. Setup

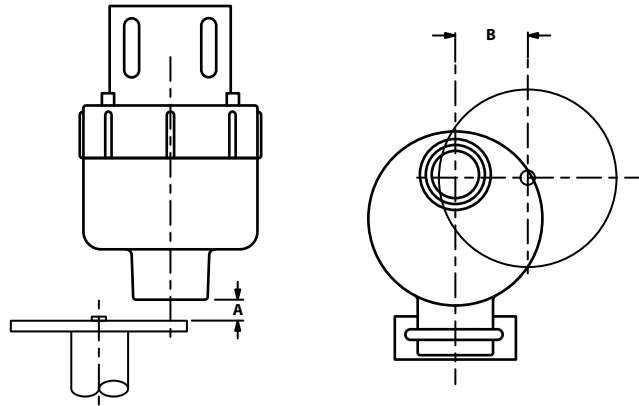
3.1 Mechanical installation

The SpeedTalker-DN (XP) may be mounted on rigid conduit or with the mounting bracket assembly (provided).

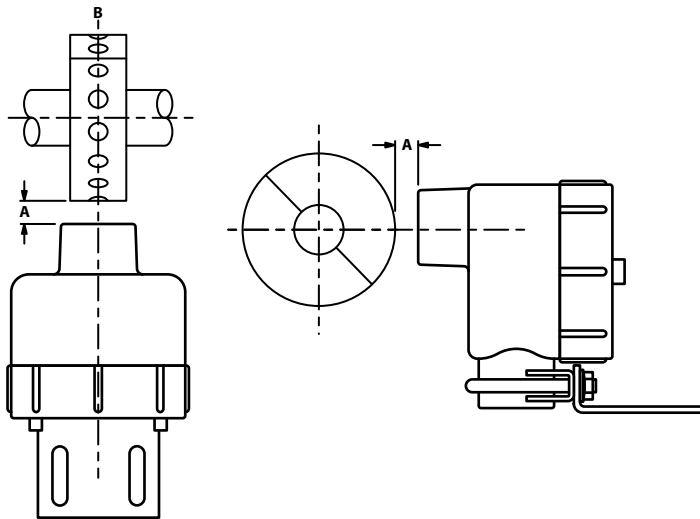
The gap (A) between the sensing head and the Pulser Disk/Wrap must be 1/16 to 1/4 inch.

The center line of the magnets (B) must align with the center of the sensing head as the Pulser Disk/ Wrap rotates.

After mounting, remove the round cover and pull network cable through the conduit port into the enclosure.



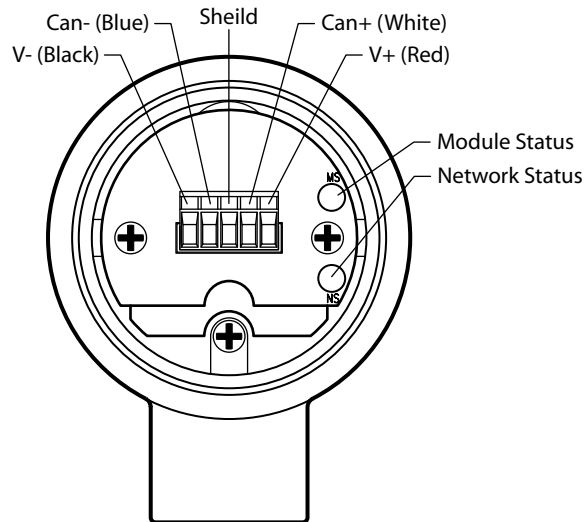
With Pulser Disk Target



With Pulser Wrap Target

3.2 Wiring, power-up and getting on-line

1. After mounting and pulling DeviceNet cable into the enclosure, remove the connector plug from its socket and connect the color-coded DeviceNet cable wires to the corresponding connector plug terminals.



Connector terminals and Indicator LEDs

2. Re-install the connector plug.
3. If the network is powered, the LEDs will sequence through a brief test: Network Status OFF, Module Status GREEN-RED-GREEN, Network Status GREEN-RED-OFF.
4. If there are no MAC ID or Baud Rate conflicts on the network, the Network Status LED should then flash GREEN indicating the node is on-line but not connected.

3.3 Set MAC ID, Baud Rate (DeviceNet Commissioning Tool required)

1. Once on-line, scan the network to find the SpeedTalker-DN (XP). Once found, you may change the MAC ID and/or Baud Rate. The factory defaults are MAC ID 63 and Baud Rate 125k.
2. MAC ID changes take effect immediately, initiating a reset sequence similar to that of power-on. Baud Rate changes don't take effect until SpeedTalker-DN (XP) power is cycled off/on.

3.4 Configure SpeedTalker parameters (DeviceNet Configuration Tool required)

1. Register the SpeedTalker-DN (XP) EDS file with your DeviceNet Configuration Tool. Your DeviceNet Configuration Tool uses this file to create a user-friendly interface to the configuration parameters.
2. Speed configuration parameters:
 - 2.1 Target Pulses/Rev (PPR)
Enter the PPR for the Pulser Disk/Wrap used.
Note: The PPR is *one-half* the number of Pulser Disk/Wrap magnets.
 - 2.2 Minimum measurable speed
Enter the minimum shaft speed (RPM) below which you want the *measured* RPM to be zero.Speed parameters may be changed in either order. Changes take effect immediately.
3. Alarm configuration parameters:
Set the configuration parameters for any/all desired Alarm functions.
Alarm parameters may be changed in any order. Changes take effect immediately.

3.5 Configure Scanner (DeviceNet Configuration Tool required)

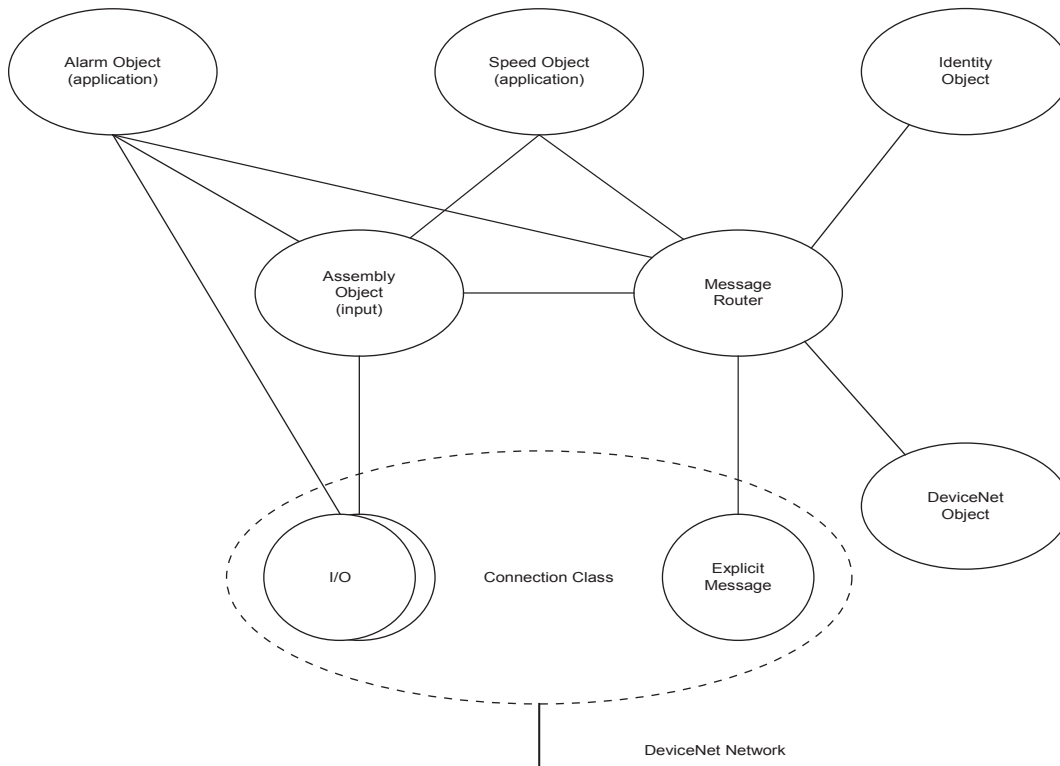
1. Add the SpeedTalker to the Scanner's scanlist:
Select the SpeedTalker-DN (XP) from the Scanner's list of available devices and add it to the scanlist.
2. Select and map the SpeedTalker Inputs:
 - 2.1 Select the desired SpeedTalker-DN (XP) input (Poll or COS) from the Scanner's list of available inputs.
The Poll connection produces the Assembly Object's data attribute value (Class ID = 4, Instance = 101, Attribute = 3).
The COS connection produces the Alarm Object's Alarm Status attribute value (Class ID = 101, Instance = 1, Attribute = 16).
 - 2.2 Map the selected input to the desired Scanner memory locations.
For the Poll connection, set the byte offset and bit length to map the desired Data Component (Speed Value, Alarm Status or both) from the I/O Assembly. **See 4.2 I/O Data Format for details.**
For Speed Value only, set the byte offset to 0 and bit length to 16.
For Alarm Status only, set the byte offset to 2 and bit length to 8.
For both, set the byte offset to 0 and bit length to 24.

3.6 Interpreting I/O data

1. Speed Value
Data type: 16-bit unsigned integer (UINT)
User-units: RPM
Resolution: 0.1 RPM
Minimum value (0x0000) represents 0.0 RPM
Maximum value (0xFFFF) represents 6,553.5 RPM.
Source: Speed Object's Measured Speed attribute (class/inst./attr. 100/1/3)
2. Alarm Status
Data type: 8-bit boolean (BYTE)
Bit assignment:
Bit 0 Alarm 1 status
Bit 1 Alarm 2 status
Bit 2 Alarm 3 status
Bit 3 Alarm 4 status
Bit 4 0 (unused)
Bit 5 0 (unused)
Bit 6 0 (unused)
Bit 7 0 (unused)
Bit encoding:
0 - Not Alarmed
1 - Alarmed
Source: Alarm Object's Alarm Status attribute (class/inst./attr. 101/1/16)

4. Device Profile

4.1 Object model



4.1.1 Objects present (generic device profile)

Object	Class ID code	Optional/required	# Instances
Identity	1	Required	1
Message Router	2	Required	1
DeviceNet	3	Required	1
Assembly	4	Required	1
Connection	5	Required	3 (Exp Mes, Poll I/O, COS I/O)
Speed (application)	100	[\geq 1 app. obj. req'd]	1
Alarm (application)	101	[\geq 1 app. obj. req'd]	1

4.1.2 Object Interfaces

Object	Interface
Identity	Message Router
Message Router	Explicit Messaging Connection Instance
DeviceNet	Message Router
Assembly	Poll I/O Connection or Message Router
Connection(s)	Message Router
Speed (application)	Assembly or Message Router
Alarm (application)	COS I/O Connection, Assembly or Message Router

4.1.3 Objects that affect behavior

Object	Effect on behavior
Identity	Supports the Reset service
Message Router	No effect
DeviceNet	Configures port attributes (baud, MAC ID, BOI proc.)
Assembly	Defines I/O data format
Connection	Contains the number of logical ports into or out of device
Speed (application)	Configures pulser-disk ppr, minimum measurable speed
Alarm (application)	Configures speed thresholds, time delays, min. ON times, over/under functionality, ON/OFF and hysteresis for Alarm 4... Alarm 1 functions

4.1.4 Object instance attributes (by Class, Instance)

Identity Object (Class ID = 1, Instance = 1)

Attrib. ID	Access Rule	Name	Data Type	Value
1	Get	Vendor ID	UINT	804
2	Get	Device Type	UINT	0 (generic profile)
3	Get	Product Code	UINT	1
4	Get	Revision	STRUCT of	
		Major rev.	USINT	---
		Minor rev.	USINT	---
5	Get	Status	WORD	[realtime code]
6	Get	Serial Number	UDINT	[unique code]
7	Get	Product Name	SHORT- STRING	“SpeedTalker-DN (XP)”
8	Get	State	USINT	0-5 (like MS)

Message Router Object (Class ID = 2, Instance = 1)

No externally visible interface to this object instance.

DeviceNet Object (Class ID = 3, Instance = 1)

Attrib ID	Access Rule	Name	Data Type	Value
1	Get/Set	MAC ID	USINT	63 (fac. def.)
2	Get/Set	Baud Rate	USINT	0 (fac. def. 125k)
3	Get/Set	BOI	BOOL	0 (fac. def. OFF)
4	Get/Set	Bus-Off Counter	USINT	0 (reset val)
5	Get	Allocation Info	STRUCT of:	
		Allocation Choice	BYTE	[alloc byte]
		Master’s MAC ID	USINT	[master MAC ID dependent]

Assembly Object (Class ID = 4, Instance = 101)

Attrib ID	Access Rule	Name	Data Type	Value
3	Get	Data	Array of bytes:	Speed (low)
				Speed (high)
				Alarm4...1

Explicit Messaging Connection Object (Class ID = 5, Instance = 1)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0x00 (reset)
2	Get	instance_type	USINT	0x00 (explicit)
3	Get	transportClass_trigger	BYTE	0x83
4	Get	produced_connection_id	UINT	[slave MAC ID dependent]
5	Get	consumed_connection_id	UINT	[slave MAC ID dependent]
6	Get	initial_comm_characteristics	BYTE	0x21 (prod grp 2, cons grp 2)
7	Get	produced_connection_size	UINT	37
8	Get	consumed_connection_size	UINT	37
9	Get/Set	expected_packet_rate	UINT	2500 (default in mS)
12	Get	watchdog_timeout_action	USINT	1 (default - auto delete)
13	Get	produced_conn_path_length	UINT	0 (default)
14	Get	produced_connection_path	EPATH	Empty
15	Get	consumed_conn_path_length	UINT	0 (default)
16	Get	consumed_connection_path	EPATH	Empty
17	Get	production_inhibit_time	UINT	0 (mS)

Poll I/O Connection Object (Class ID = 5, Instance = 2)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0x00 (reset)
2	Get	instance_type	USINT	0x01 (I/O)
3	Get	transportClass_trigger	BYTE	0x83
4	Get	produced_connection_id	UINT	[slave MAC ID dependent]
5	Get	consumed_connection_id	UINT	[slave MAC ID dependent]
6	Get	initial_comm_characteristics	BYTE	0x01 (prod grp 1, cons grp 2)
7	Get	produced_connection_size	UINT	3
8	Get	consumed_connection_size	UINT	0
9	Get/Set	expected_packet_rate	UINT	[must be set]
12	Get	watchdog_timeout_action	USINT	0 (default - Timed Out state)
13	Get	produced_conn_path_length	UINT	6
14	Get	produced_connection_path	EPATH	“20 04 24 65 30 03”
15	Get	consumed_conn_path_length	UINT	6
16	Get	consumed_connection_path	EPATH	“20 64 24 01 30 04”
17	Get/Set	production_inhibit_time	UINT	0 (mS)

COS I/O Connection Object (Class ID = 5, Instance = 4)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get	State	USINT	0x00 (reset)
2	Get	instance_type	USINT	0x01 (I/O)
3	Get	transportClass_trigger	BYTE	0x12 or 0x10 [per ack setting]
4	Get	produced_connection_id	UINT	[slave MAC ID dependent]
5	Get	consumed_connection_id	UINT	[slave MAC ID dependent]
6	Get	initial_comm_characteristics	BYTE	0x01 or 0x0F [per ack setting]
7	Get	produced_connection_size	UINT	1
8	Get	consumed_connection_size	UINT	0
9	Get/Set	expected_packet_rate	UINT	[must be set]
12	Get	watchdog_timeout_action	USINT	0 (default - Timed Out state)
13	Get	produced_conn_path_length	UINT	6
14	Get	produced_connection_path	EPATH	“20 65 24 01 30 10”
15	Get	consumed_conn_path_length	UINT	6
16	Get	consumed_connection_path	EPATH	“20 64 24 01 30 04”
17	Get/Set	production_inhibit_time	UINT	0 (mS)

Speed (application) Object (Class ID = 100, Instance = 1)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	PPR	UINT	8 (fac. def), range: 1 -> 256
2	Get/Set	Minimum Speed	UINT	10 (fac. def.), range: 1 -> 65535
3	Get	Measured Speed	UINT	[measured RPM]

Alarm (application) Object (Class ID = 101, Instance = 1)

Attribute ID	Access Rule	Name	Data Type	Value
1	Get/Set	Alarm 1 Threshold	UINT	10 (fac. def), range 1 -> 65535
2	Get/Set	Alarm 1 On Delay Time	USINT	0 (fac. def), range 0 -> 250
3	Get/Set	Alarm 1 On Minimum Time	USINT	0 (fac. def), range 0 -> 250
4	Get/Set	Alarm 2 Threshold	UINT	10 (fac. def), range 1 -> 65535
5	Get/Set	Alarm 2 On Delay Time	USINT	0 (fac. def), range 0 -> 250
6	Get/Set	Alarm 2 On Minimum Time	USINT	0 (fac. def), range 0 -> 250
7	Get/Set	Alarm 3 Threshold	UINT	10 (fac. def), range 1 -> 65535
8	Get/Set	Alarm 3 On Delay Time	USINT	0 (fac. def), range 0 -> 250
9	Get/Set	Alarm 3 On Minimum Time	USINT	0 (fac. def), range 0 -> 250
10	Get/Set	Alarm 4 Threshold	UINT	10 (fac. def), range 1 -> 65535
11	Get/Set	Alarm 4 On Delay Time	USINT	0 (fac. def), range 0 -> 250
12	Get/Set	Alarm 4 On Minimum Time	USINT	0 (fac. def), range 0 -> 250
13	Get/Set	Threshold % Hysteresis	USINT	10 (fac. def), range 0 -> 250
14	Get/Set	Alarm 4...1 Overspeed/Underspeed Select	BYTE	0x00 (fac. def), bit encoding: 1 OVER, 0 UNDER
15	Get/Set	Alarm 4...1 On/Off Settings	BYTE	0x00 (fac. def), bit encoding: 1 ON, 0 OFF
16	Get	Alarm (4...1) Status	BYTE	bit encoding: 1 ALARMED, 0 NOT ALARMED

Application Object (Speed, Alarm) attribute user units:

Speed settings/measurements are in RPM.

Time settings are in seconds.

Hysteresis settings are in %.

Application Object (Speed, Alarm) attribute encoding:

User-units resolution for all integer type (UINT, USINT) attributes (except PPR) is 0.1 (e.g. integer change of 1 equals 0.1 change in RPM, seconds or %).

User-units resolution for PPR attribute is 1 (integer change of 1 equals PPR change of 1).

Bit assignment for BYTE type attributes

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
--	--	--	--	Alarm 4	Alarm 3	Alarm 2	Alarm 1

4.2 I/O Data Format

4.2.1 I/O Assembly Instances

Number	Type	Name
1	Input	Input data

4.2.2 Format of I/O Assembly Data

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Speed Value Low							
1	Speed Value High							
2	0	0	0	0	Alarm4	Alarm3	Alarm2	Alarm1

4.2.3 I/O Assembly Data Attribute Mapping

Data Component Name	Class		Inst. Number	Attribute		Data Type
	Name	Number		Name	Number	
Speed Value	Speed	100	1	Meas. Speed	3	UINT
Alarm Status	Alarm	101	1	Status	16	BYTE

Notes:

Speed Value resolution is 0.1 (UINT change of 1 equals 0.1 change in RPM).

I/O Assembly Data (class/inst./attr. 4/101/3) is produced by the Poll connection.

Alarm Status (class/inst./attr. 101/1/16) is produced by the COS connection.

4.3 Device Configuration

Configurable parameters and definition of public interface

4.3.1 Configuration parameter listing (EDS) and effect on behavior

Number	Name	Effect on behavior
1	Target pulses/rev	Sets target +/- pulses per revolution for correct RPM reading
2	Minimum meas. speed	Sets the actual speed below which the measured speed is 0
3	Measured speed (read-only)	[not write-able - no effect on behavior]
4	Alarm 1 threshold	Sets speed levels for Alarm1 Overspeed/Underspeed functions
5	Alarm 1 ON delay	Time that meas. speed must be at alarm-level for alarmed state
6	Alarm 1 ON min time	Minimum time Alarm 1 stays alarmed
7	Alarm 2 threshold	Sets speed levels for Alarm2 Overspeed/Underspeed functions
8	Alarm 2 ON delay	Time that meas. speed must be at alarm-level for alarmed state
9	Alarm 2 ON min time	Minimum time Alarm 2 stays alarmed
10	Alarm 3 threshold	Sets speed levels for Alarm3 Overspeed/Underspeed functions
11	Alarm 3 ON delay	Time that meas. speed must be at alarm-level for alarmed state
12	Alarm 3 ON min time	Minimum time Alarm 3 stays alarmed
13	Alarm 4 threshold	Sets speed levels for Alarm4 Overspeed/Underspeed functions
14	Alarm 4 ON delay	Time that meas. speed must be at alarm-level for alarmed state
15	Alarm 4 ON min time	Minimum time Alarm 4 stays alarmed
16	Alarm threshold hysteresis	Sets hysteresis - applies to all Alarm thresholds
17	Alarm 4...1 OVER/UNDER	bits 3...0 select Alarm 4...1 functions: 1-Overspeed / 0-Under
18	Alarm 4...1 ON/OFF	bits 3...0 turn Alarm 4...1 functions on/off: 1-ON / 0-OFF
19	Alarm (4...1) status (read-only)	[not write-able - no effect on behavior]

4.3.2 Configuration Parameter Mapping (EDS)

Number	Name	Class		Inst. Number	Attrib. Number	Data Type
		Name	Number			
1	Target pulses/rev	Speed	100	1	1	UINT
2	Minimum measurable speed	Speed	100	1	2	UINT
3	Measured speed (read-only)	Speed	100	1	3	UINT
4	Alarm 1 threshold	Alarm	101	1	1	UINT
5	Alarm 1 ON delay	Alarm	101	1	2	USINT
6	Alarm 1 ON min time	Alarm	101	1	3	USINT
7	Alarm 2 threshold	Alarm	101	1	4	UINT
8	Alarm 2 ON delay	Alarm	101	1	5	USINT
9	Alarm 2 ON min time	Alarm	101	1	6	USINT
10	Alarm 3 threshold	Alarm	101	1	7	UINT
11	Alarm 3 ON delay	Alarm	101	1	8	USINT
12	Alarm 3 ON min time	Alarm	101	1	9	USINT
13	Alarm 4 threshold	Alarm	101	1	10	UINT
14	Alarm 4 ON delay	Alarm	101	1	11	USINT
15	Alarm 4 ON min time	Alarm	101	1	12	USINT
16	Alarm threshold hysteresis	Alarm	101	1	13	USINT
17	Alarm 4...1 Over/Under	Alarm	101	1	14	BYTE
18	Alarm 4...1 ON/OFF	Alarm	101	1	15	BYTE
19	Alarm (4...1) status (read-only)	Alarm	101	1	16	BYTE

4.3.3 Configuration Parameter Groups (EDS)

Group Number	Group Name	Parameter Number	Parameter Name		
1	Speed Configuration	1	Target pulses/rev		
		2	Minimum measurable speed		
		3	Measured speed (read-only)		
2	Alarm Configuration	4	Alarm 1 threshold		
		5	Alarm 1 ON delay		
		6	Alarm 1 ON min time		
		7	Alarm 2 threshold		
		8	Alarm 2 ON delay		
		9	Alarm 2 ON min time		
		10	Alarm 3 threshold		
		11	Alarm 3 ON delay		
		12	Alarm 3 ON min time		
		13	Alarm 4 threshold		
		14	Alarm 4 ON delay		
		15	Alarm 4 ON min time		
		16	Alarm threshold hysteresis		
		17	Alarm 4...1 Over/Under		
		18	Alarm 4...1 ON/OFF		
		19	Alarm (4...1) status (read-only)		
		3	Monitor	3	Measured speed (read-only)
				19	Alarm (4...1) status (read-only)

Note: The configuration parameters are defined in the Electronic Data Sheet (EDS) only. The SpeedTalker_DN (XP) does not contain Parameter Objects.

5. Specifications

Measurable shaft speed range	0.0 to 6,553.5 RPM
Pulse frequency range	0.0112 to 31,250 Hz
Measurement accuracy (over temp)	0.02% max error (frequency)
Measurement/setting resolution	0.1 RPM
Pulser Disk/Wrap pulses/revolution	1 to 256 PPR
Airgap (sensing head to Disk/Wrap)	1/16 to 1/4 inch (2 to 6 mm)
Operating Power (network supplied)	11Vdc (60mA) to 25Vdc (40 mA)
DeviceNet implementation	Node type Group 2 Only slave Connections Poll, COS, Explicit Message Profile Generic Device Baud rates 125k, 250k, 500k Indicators Module, Network Status Connector Open style Configuration Electronic Data Sheet (EDS)
Operating Temperature	-40 to 85 °C (-40 to 185 °F)

Enclosure hazardous locations ratings



Class I, Div 1, Group C, D
 Class II Groups E, F, G
 UL File: E249019

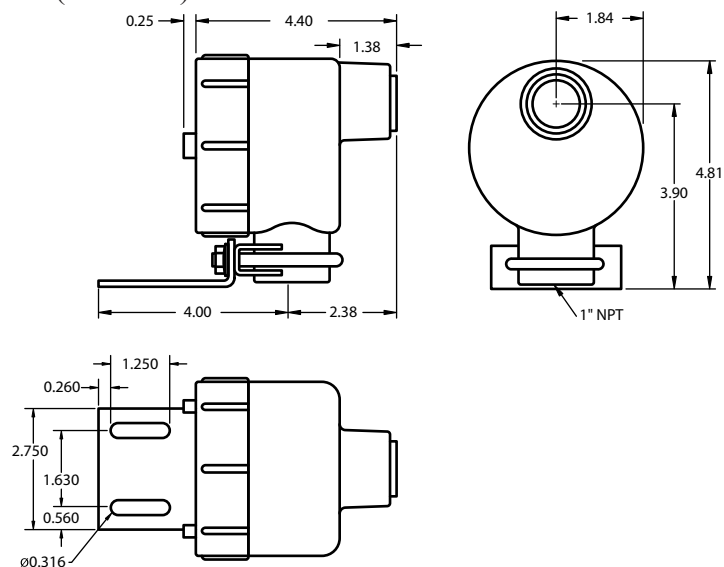


Weight (with bracket)

2.45 Lb (1.11 kg)

Dimensions (with bracket)

(in inches)



Specifications are subject to change without notice.