ASG-NW2500 Network Module
ACOP / EtherNet/IP™ / ToolsNet / ProfiNet

User Guide

Version 1.1.0

September, 2020

ASG, Division of Jergens, Inc.

15700 S. Waterloo Road | Cleveland, OH 44110-3898 | Phone: (888) 486-6163 | Fax: (216) 481-4519 | Email: asginfo@asg-jergens.com | Web: www.asg-jergens.com

ASG Precision Fastening ASG-NW2500 User Guide

Version 1.1.0

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ASG-NW2500 Firmware Level v5.1.0+

To download the latest version of this manual visit:

www.asg-jergens.com

ASG Precision Fastening

(888) 486-6163

15700 S. Waterloo Rd.

Cleveland, OH 44110

USA

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Safety Precautions

Be sure to read all instructions and precautions contained in this manual, failure to do so may result in personal injury and/or damage to tooling and components.

DAMAGE REQUIRING SERVICE – Unplug this product from the wall outlet and request servicing by qualified service personnel under the following conditions:

- If liquid has been spilled onto the enclosure of the unit.
- If the product does not function normally by following the instructions in the User Guide. Adjust only those controls that are covered by the operating instructions. Improper adjustment of the controls may result in damage and will often require rework by a qualified technician to restore the product to its normal operation.
- If the product has been damaged in any way.
- When the unit displays a negative, distinct change in performance.

Do not operate or plug in the controller/system with wet hands or in wet environments. Failure to observe this may result in injury due to electric shock.

Do not operate this equipment from any power source other than that delivered by the ASG-CT2500 itself.

Ensure the ASG-CT2500 is properly plugged in to a grounded electrical receptacle. Do not remove the ground pin or use any adapter plugs.

POWER CORD PROTECTION – The power supply cord for the ASG-CT2500 acts as the main-disconnect. It should be routed or installed in such a matter to protect it from being walked on or pinched. The unit should be powered down completely before connecting or disconnecting the power cable. The power cord should be removed before moving the unit. **The power cord must be placed near an easily accessible unobstructed socket outlet.**

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Do not use any part of the system (tool, cable, or controller) for anything other than its specified application. Use of the system or its components for unintended applications could result in injury to the operator, failure of the system, and could void the warranty.

CLEANING – If it should become necessary to clean this equipment, disconnect the unit from its power source first. Do not use liquid cleaners, aerosols, abrasive pads, scouring powders or solvents, such as benzene or alcohol. Use a soft cloth lightly moistened with a mild detergent solution. Ensure the surface cleaned is fully dry before reconnecting power.

Never modify or disassemble any component of the system. Modification or disassembly of the system could result in injury and void the warranty.

Always shut down the equipment and disconnect from all power sources prior to changing or servicing equipment. Failure to do so could in injury or damage to the equipment.

Always use safety glasses when using electrical assembly tools.

Do not wear loose clothing, dangling jewelry, or loose unbraided long hair when operating this tool. A risk of entanglement is possible that may result in minor injury to the Operator.

Keep work area clear of clutter and distractions that may cause the operator to lose control of the tool or the components.

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CAUTION – Do not use this tool if you are ill, on medication that is known to cause hand-eye coordination problems, under the influence of alcohol, illegal drugs or other impairing substances, or suffering from depression. This includes over-the-counter medications if they cause drowsiness, impaired judgment, or diminished physical skills. Consult with your management and advise them of your condition.

Do not operate this equipment without all guards and covers in place.

WATER AND MOISTURE – Do not place containers with liquids such as coffee, water, sodas, etc. on this unit. **Do not operate this unit in a wet environment.**

Electronics Disposal - Must be recycled as required by local environmental law – do not dispose of by adding to the Municipal waste stream.

Metal/Other Parts of the System - Must be recycled as required by local environmental law.

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Introduction

The ASG-NW2500 module is an add-on accessory to the ASG-CT2500 X-PAQ™ controller. It allows for the real-time export of a fastener's rundown torque/angle data through ACOP (Open Protocol), EtherNet/IP™ (EIP), and ProfiNet formats. It also allows for communication using Atlas Copco ToolsNet software.
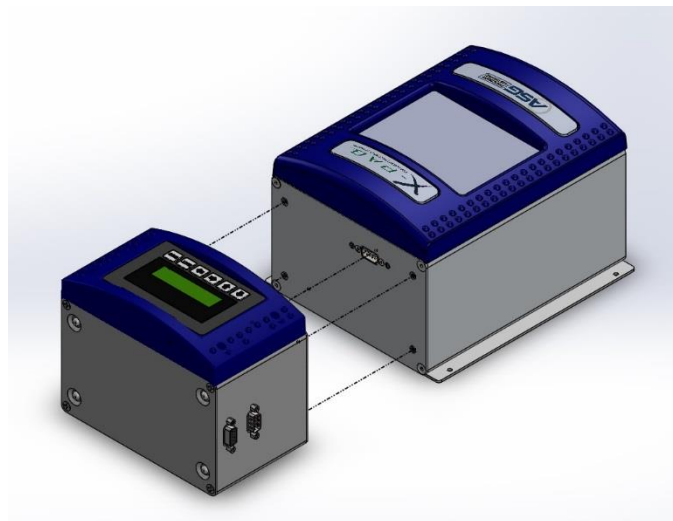
Quick Start Guide

Installation

Remove the protective cover from the X-PAQ™ controller top plate to expose the 9-pin connector.
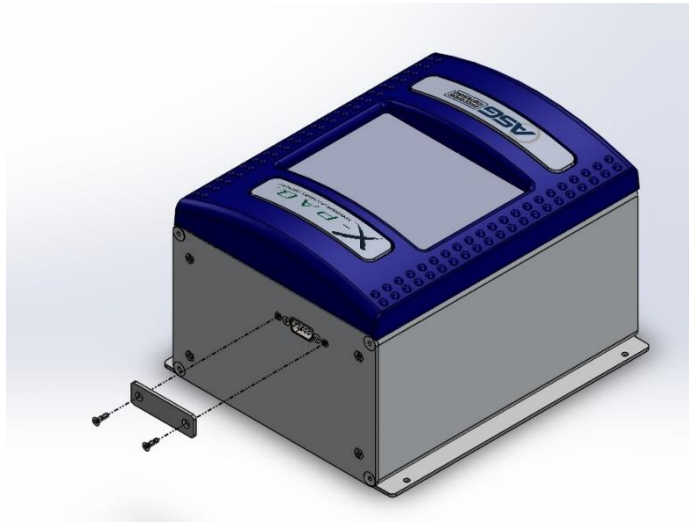
Align the 9-pin port of the ASG-NW2500 to the mating port on the top of the X-PAQ™ controller, connect, and tighten 4 screws.

Setup

1. The ASG-NW2500 requires a static IP address for the network, it is not DHCP compatible. Obtain the following network address information from your network administrator to program into the module. This should include:
    a. IP Address
    b. Subnet Mask
    c. Gateway
2. Connect the power cable and Ethernet cable (RJ45 connector) to the ASG-NW2500.
3. Power up the X-PAQ™.

Network Configuration

4. On the network user interface, press ENT to go to the setup menu.
5. The unit will prompt you for a password. The default password is "<u>0104</u>".
6. The first entry of the programming menu is the "IP Address". Press ENT to change the address.
7. Using the arrow keys, input the address provided by your network administrator and press ENT to save the new address.
8. Press down to go to the "Subnet Mask". Enter the mask provided by your network administrator using the same process as the IP Address.
9. From the "Subnet Mask" entry of the setup menu, press down to go to the "Gateway". Enter the gateway provided by your network administrator using the same process as the IP Address.

At this point, you should be able to connect to and use your X-PAQ™ with the ASG-NW2500.

Dimensions

Dimensions are in inches.
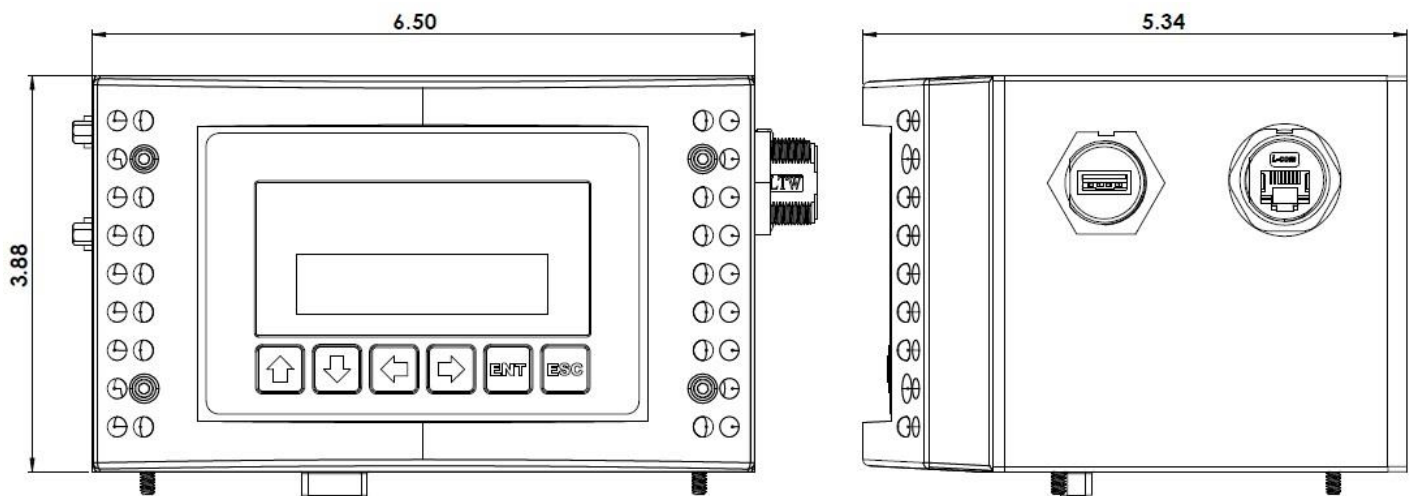
Overview

The ASG-NW2500 is a network card that provides network connectivity to a plant floor control network using the Atlas Copco Open Protocol (ACOP), EtherNet/IP^{TM}, and ToolsNet. This card adds an additional human-machine interface (LCD display and keypad) and several additional connectors used to attach to the network or other devices.
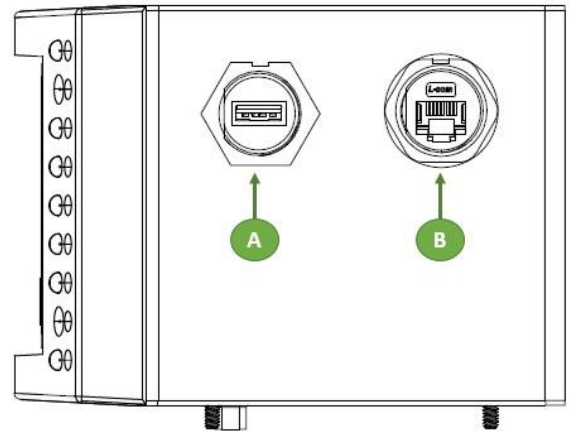
Device Connectivity

USB Port A

A USB port is provided so the ASG-NW2500 can connect to a USB barcode reader or a USB drive to download new firmware or upload log data.

Network Connector (RJ45) B

The Ethernet port is used to transmit and receive TCP/IP messages in one of the above mentioned protocols.

Serial Printer/Serial ACOP C Communication

A female DSUB9 connector is provided so that this unit can be connected to a serial printer. A result string is sent out of this port each time a fastening event occurs. This port may also be used to make serial ACOP connections.

PINOUT
2 – TX
3 – RX
5 – GND

Bar Code Reader D

A male DSUB9 connector is provided for the ASG-NW2500 to communicate with a serial bar-code reader. Further information about the bar codes supported by the ASG-NW2500 is later in the manual.

PINOUT
2 – RX
3 – TX
5 – GND

9
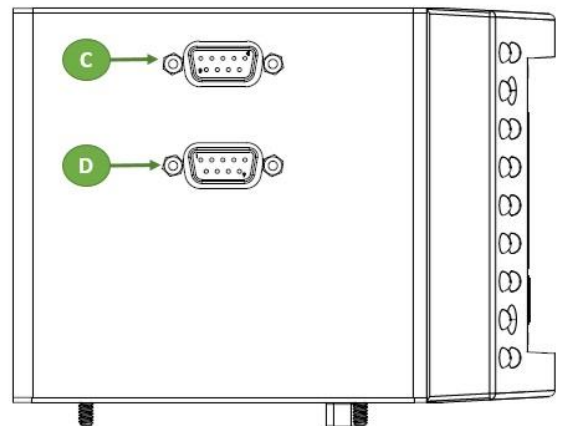
Network Human-Machine Interface (HMI)

The majority of all settings and programming for the ASG-NW2500 is accomplished through the 6 buttons on the HMI.
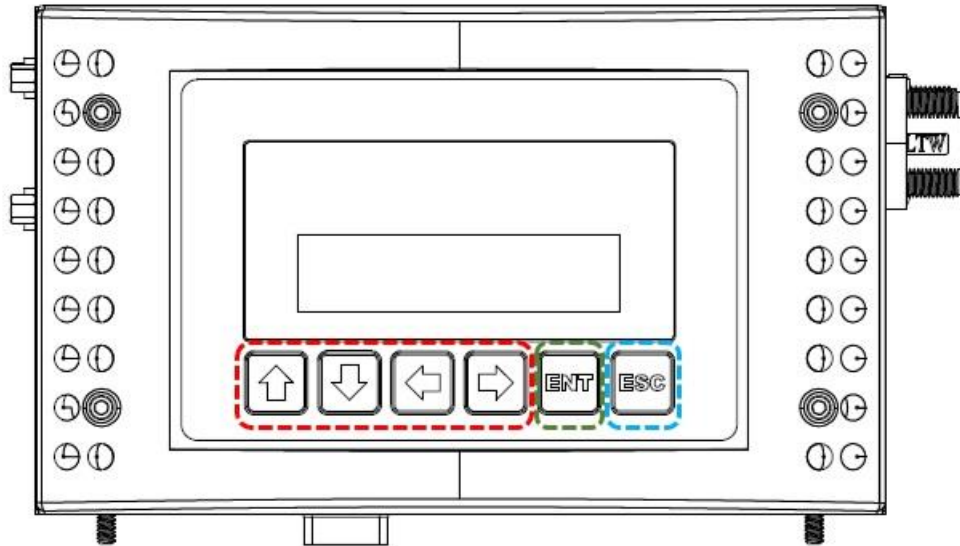
Arrow Keys

Used to navigate between menu choices and character fields and to toggle between programmed options.

ENT Key

Used to select a menu option or save a program change within a menu.

ESC Key

Used to return to a previous menu level.

During startup, the HMI will display the firmware version of the network controller in the ASG-NW2500. After that, the display will go into Operating Mode.

Operating Mode

In Operating Mode, the HMI will show the current operating status of the unit. To cycle through the various pieces of status information, use the up/down or left/right arrows on the HMI.

Unit IP Address

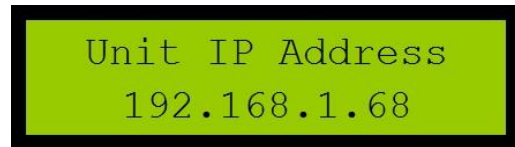The default information shown on the HMI is the unit's IP address. This will correspond to the value entered during setup, as described in the Quick Start Guide earlier in this document. This is the address the plant control system needs to use to communicate with this unit.

```
Unit IP Address
  192.168.1.68
```

ACOP Task

This screen shows the currently active task number. This number should also appear on the X-PAQ™ as the selected task.

```
   ACOP Task
       0
```
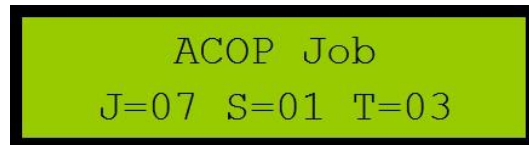
ACOP Job

This screen shows the information about the currently active job if one is running.

```
    ACOP Job
  No Active Job
```

```
    ACOP Job
  J=07 S=01 T=03
```

If no job is running, the screen shows "No active job".

If a job is running, the screen will show:

J=07 S=01 T=03

where J is the active job number, S is the step number within the job, and T is the task number for that step.

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Active Connection Information

Operating mode will also show the information about any active network connections. If no connections exist, the unit will show "No active connections".

```
   No active
  connections
```

Each connection will show the IP address of the connected client and some information that depends on the protocol of network connection.

```
   Conn 1 IP
  192.168.1.60
```
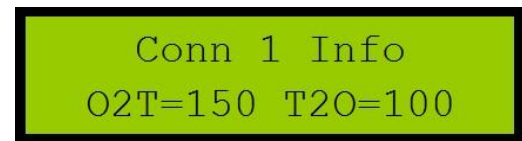
ACOP

ACOP connections show the last MID received.

```
  Conn 1 Info
    MID=0060
```

EtherNet/IP^{TM}

EtherNet/IP^{TM} connections show the connection points uses by the connection. Depending on the client, an EtherNet/IP^{TM} connection may have an additional active connection for the control operations. This extra connection will be shown with simply a session id.

```
  Conn 1 Info
 O2T=150 T2O=100
```

Setup Mode

To enter the Setup Mode from Operating Mode, press ENT and enter the password for the unit. The default password is "__0104__". Once at the setup menu, cycle through the various menu options using the up and down arrows.

```
 Enter Password
     0***
```

Pressing ENT will go to the editing screen for the selected option. Pressing ESC will return to Operating Mode.

When in an editing screen, the arrow keys are used to enter the information. Screens that require you to enter a multi-digit or character value will use the up and down arrow keys to cycle through values for that digit or character and left and right arrow keys to move from character to character. Screens with a fixed set of options will use any of the arrow keys to cycle through the options. Some screens with a single number value will use the up or down arrows to add or subtract 1 and right or left arrows to add or subtract 10. For all screens, pressing ENT will save the entered value and pressing ESC will return to the Setup Menu without changing the value.

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IP Address

This menu selects the IP address used by the ASG-NW2500. Ask your network administrator for the correct value for this setting. Each unit in the same network should have a unique IP address.

```
PROGRAMMING
 IP Address
```

Subnet Mask

This menu determines the subnet mask used by the ASG-NW2500. Ask your network administrator for the correct value for this setting. All units in the same network will generally have the same subnet mask.

```
PROGRAMMING
Subnet Mask
```

Gateway

This menu determines the gateway address used by the ASG-NW2500. Ask your network administrator for the correct value for this setting. All units in the same network will generally have the same gateway address.

```
PROGRAMMING
  Gateway
```

MAC Address

This menu displays the unique MAC address issued to the ASG-NW2500.

```
PROGRAMMING
MAC Address
```

Control Name

This menu sets the 25 character Controller Name reported by the ASG-NW2500 in ACOP result messages. Letters, numbers, and some special characters (_, -, .) are allowed. You may also set the controller name with a bar code command (03).

```
PROGRAMMING
Control Name
```

Note: This is not the same value as the Controller Name that is programmable inside the X-PAQ^{TM} Controller.

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Serial Printer

This menu determines the baud rate of the serial printer, and if the ASG-NW2500 makes ACOP communications over serial, the baud rate of those communications. The available selections are 9600, 19200, 38400, 57600, and 115200 baud rates.

```
PROGRAMMING
Serial Printer
```

See section later in this document for output format and example.

Note: When the serial printer is set to "OFF", the ACOP connections will operate at 9600 baud.

Serial Print Format

This menu determines the format of the data sent out through the serial printer port. Options are 'None', 'Line', and 'CSV'.

```
PROGRAMMING
Serial Print Fmt
```

See section later in this document for output format examples.

Note: When the serial printer format is set to "None", no data will be transmitted from the RS-232 port.

Bar Code Reader

This menu determines the baud rate of the serial bar code reader. The available selections are 9600, 19200, 38400, 57600, and 115200 baud rate.

```
PROGRAMMING
Barcode Reader
```

Edit Password

This menu allows you to change the password required to enter Setup Mode. **Be sure to remember the password entered or you will not be able to configure the device through the HMI.**

```
PROGRAMMING
Edit Password
```

Pick Task

This menu allows you to select a task. You may also select tasks with a bar code (11) or ACOP (MID 0018) command.

```
PROGRAMMING
Pick Task
```

Note: See the section "Mapping of ACOP commands to X-PAQ^{TM} Inputs" later in this document for X-PAQ^{TM} setup requirements to execute this function.

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Task Max

This menu allows you to select the maximum task number accepted from ACOP or barcodes. This option should be set to match the number of tasks in the X-PAQ (Default setting: 63).

```
PROGRAMMING
Task Max
```

Pick Job

This menu allows you to begin a pre-defined job. Jobs are defined using the X-PAQ™ ACOP Manager PC Application. You may also select jobs with a bar code (05) or ACOP (MID 0038) command.

```
PROGRAMMING
Pick Job
```

Note: Task selection input programming on X-PAQ™ controller required. See "Mapping of ACOP commands to X-PAQ™ Inputs" later in this document for X-PAQ™ setup requirements to execute this function.

Edit Tool SERNUM

This menu sets the 14 digit tool serial number that is reported by the ASG-NW2500 in ACOP messages. Letters, numbers, and some special characters (_, -, .) are allowed.

```
PROGRAMMING
Edit Tool SERNUM
```

Note: This field has no relation to the serial number programmed into the connected ASG-SD2500 tool.

Reset Defaults

This menu allows you to return some or all portions of the device to the factory defaults. Once started, this operation **cannot be undone**.

```
PROGRAMMING
Reset Defaults
```

The options for this menu are:

- All – Resets all information in the device.
- Configuration – Resets only the configuration options set up by the setup menu. You will have to reassign the unit's network information before you can connect to the unit again.
- Jobs – Erases all jobs stored in the unit.
- Tasks & Jobs – Erases all tasks and jobs stored in the unit. Since jobs depend strongly on the tasks, there is not an option to erase only tasks.
- Events – Erases all stored tightening results and event log entries.

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Edit Unit SERNUM

This menu sets the 10 digit controller serial number that is reported by the ASG-NW2500 in ACOP result messages. Letters, numbers, and some special characters (_, -, .) are allowed.

```
      PROGRAMMING
    Edit Unit SERNUM
```

Note: This field has no relation to the serial number programmed into the connected ASG-SD2500 tool.

ACOP Setup

This menu goes to the submenu for setting up ACOP settings.

Press ENT to enter this sub-menu and configure ACOP-specific settings.

```
      PROGRAMMING
      ACOP Setup
```

Port Number

This menu selects the TCP port number used for ACOP network connections. The ASG-NW2500 is set to the port recommended in the protocol specification by default. All units in the same network will generally have the same port number.

```
      ACOP Setup
      Port Number
```

Only change this value if you are certain your network uses another port.

Default: 4545

Range: 0 to 65535

Message Timeout

This menu determines the number of seconds between retries for a subscription notification. If no response to a notification is received after the specified time, the notification will be sent up to the specified number of retries (see Resend Attempts below). If the number of retries completes without a response, the notification failed and the network connection will be closed.

```
      ACOP Setup
    Message Timeout
```

Default: 10

Range: 1 to 30

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Resend Attempts

This menu determines how many times the ASG-NW2500 will send a subscription notification. If no response to a notification is received after the specified number of tries, the notification failed and the network connection will be closed.

```
   ACOP Setup
Resend Attempts
```

Default: 3

Range: 1 to 10

Keep Alive

This menu determines how long (in seconds) the ASG-NW2500 will keep a connection open without any data transmissions. If this value is set to 0, the connection will never be closed due to inactivity (unless No Msg Timeout is used). Most control systems should have an option to send the MID 9999 Keep Alive packet.

```
 ACOP Setup
 Keep Alive
```

Default: 30

Range: 0 to 7200

Recommendation: Set the Keep Alive on the ASG-NW2500 to at least twice the period at which the control system sends the keep alive packet to ensure a single missed packet does not cause a connection to be dropped.

Xmit Rev/Space

This menu determines if spaces are sent in the revision portion of a MID command or response when possible. As per the specification, this option will only affect commands sent with revision #1; any revision other than #1 will always be left as a number in the command string.

```
  ACOP Setup
Xmit Rev/Space
```

This option does not affect how the ASG-NW2500 interprets data from another device. Other devices may send spaces or 001 for commands with revision #1 regardless of this option. Similarly, most devices should not be affected by this option, but it is provided in case a device requires one way or the other.

Default: Rev

Values: Rev, Space

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OP Cmd Enable

This menu allows you to enable or disable "Open Protocol commands", which are a subset of the full list of supported commands. Effectively, disabling the Open Protocol commands makes the unit read-only from the ACOP network perspective. The full list of commands that are disabled by this option can be seen in section 4.4 of the Atlas Copco Open Protocol specification.

```
  ACOP Setup
OP Cmd Enable
```

Default: Yes

Values: No, Yes

Cell ID

This menu sets the 4 digit Cell ID reported by the ASG-NW2500 in ACOP result messages. Only numbers (0-9) are allowed. You may also set the controller cell ID with a bar code command (01).

```
  ACOP Setup
   Cell ID
```
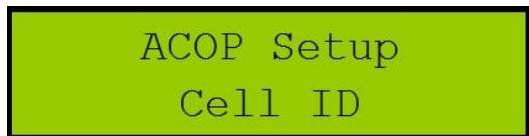
Default: 0

Range: 0 to 9999

Channel ID

This menu sets the 2 digit Channel ID reported by the ASG-NW2500 in ACOP result messages. Only numbers (0-9) are allowed. You may also set the controller channel ID with a bar code command (02).

```
  ACOP Setup
  Channel ID
```

Default: 0

Range: 0 to 99

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ToolsNet Setup

This menu goes to the submenu for setting up ToolsNet settings.

Press ENT to enter this sub-menu and configure ToolsNet-specific settings.

```
      PROGRAMMING
    ToolsNet Setup
```

Enabled/Disabled

This setting determines if the ASG-NW2500 will attempt to establish a ToolsNet connection. Unlike the other supported network protocols, ToolsNet requires the controller to establish connections. Since the ASG-NW2500 will repeatedly make network requests to attempt to establish a network connection to the ToolsNet server, you should only enable ToolsNet if you have a server set up in the network.

```
    ToolsNet Setup
    Enabled/Disabled
```

Default: Disabled

Values: Disabled, Enabled

PIM Address

This setting controls the IP address the ASG-NW2500 will use to establish a ToolsNet connection.

Default: 192.168.1.66

```
    ToolsNet Setup
     PIM Address
```

PIM Port

This setting controls the port the ASG-NW2500 will use to establish a ToolsNet connection at the PIM server address.

Default: 6575

Range: 0 to 65535

```
    ToolsNet Setup
      PIM Port
```

PIM Retry Inter

This setting controls how long the ASG-NW2500 will wait after a failed attempt to establish a ToolsNet connection before it makes another connection attempt.

Default: 60 seconds

Range: 0 to 3600 seconds

```
    ToolsNet Setup
    PIM Retry Inter
```

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Result Timeout

This setting controls how long the ASG-NW2500 will wait for a response from the ToolsNet server when sending a tightening or keep alive packet. If no response is received within the specified result timeout, the ASG-NW2500 will try again, up to the specified number of retries.

```
ToolsNet Setup
Result Timeout
```

Default: 5 seconds

Range: 0 to 60 seconds

If no response is received after all retries, the ToolsNet connection is considered broken and will have to be re-established.

Keep Alive

This setting controls how often the ASG-NW2500 will send a keep alive packet to the ToolsNet server if no other packets are being sent. When set to 0, the ASG-NW2500 does not send keep alive packets.

```
ToolsNet Setup
Keep Alive
```

Default: 30 seconds

Range: 0 to 3600 seconds

This value is recommended to be less than half the inactivity timeout of the server to ensure the connection is not closed due to a single missed keep alive packet. For example, if the server is configured to timeout after 30 seconds of inactivity, the keep alive setting on the unit should be less than 15 seconds.

System Number

This setting controls the system number the ASG-NW2500 reports to the ToolsNet server in identification and tightening packets.

```
ToolsNet Setup
System Number
```

Default: 1

Range: 0 to 9999

Station Number

This setting controls the station number the ASG-NW2500 reports to the ToolsNet server in identification and tightening packets.

```
ToolsNet Setup
Station Number
```

Default: 1

Range: 0 to 9999

Retries

This setting controls how many times the ASG-NW2500 will resend a tightening or keep alive packet to the ToolsNet server before considering the connection broken.

```
ToolsNet Setup
    Retries
```

If no response is received within the specified result timeout, the ASG-NW2500 will try again, up to the specified number of retries. If no response is received after all retries, the ToolsNet connection is considered broken and will have to be re-established.

Default: 2

Range: 0 to 10

Encap Timeout

This setting controls the EtherNet/IP Encapsulation Inactivity Timeout in seconds used by the NW2500. This should be left at the default value unless you are having problems staying connected to the module via EtherNet/IP.

```
PROGRAMMING
Encap Timeout
```

Default: 120 seconds

Range: 0 to 3600 (0 = no disconnection for encapsulation inactivity timeout)

PROFINET Enabled

This setting determines if PROFINET is enabled in the NW2500. Please be aware that when enabling PROFINET, the IP address in the NW2500 will be erased and will either need to be reentered through the menu or set by a PROFINET configuration tool.

```
PROGRAMMING
PROFINET Enabled
```

ACOP functionality

The ASG-NW2500 implements controller functionality for the Atlas Copco Open Protocol. It supports only a single Ethernet connection at a time. Command MIDs and revisions are implemented according to the Atlas Copco Open Protocol Specification release 1.3 revision 1.

Supported Commands

Revision lists with a '*' indicate that one or more revisions of the MID is not supported. Otherwise, the listed supported revisions are all revisions in the specification version mentioned above.

MID	Revisions	Command
0001,0002	1-4	Communication start (acknowledge)
0003	1	Communication stop
0004	1	Command error
0005	1	Command accepted
0010,0011	1	Parameter set ID upload request/reply
0014-0017	1	Parameter set selected (subscribe/acknowledge/unsubscribe)
0018	1	Select Parameter set
0020	1	Reset Parameter set batch counter
0030,0031	1-2	Job ID upload request/reply
0034-0037	1-4	Job info (subscribe/acknowledge/unsubscribe)
0038	1-2	Select Job
0039	1-2	Job restart
0040	1-4	Tool data upload
0042	1	Disable tool
0043	1	Enable tool
0050	1	Vehicle ID Number download request
0051-0054	1-2	Vehicle ID Number (subscribe/acknowledge/unsubscribe)
0060-0063	1-4*	Last tightening result data (subscribe/acknowledge/unsubscribe)
0064,0065	1-4*	Old tightening result upload request/reply
0127	1	Job abort
0150	1	Identifier download request
0151-0154	1	Multiple identifier and result parts (subscribe/acknowledge/unsubscribe)
0156	1	Reset latest Identifier
0157	1	Reset all Identifiers
0420-0423	1	Open Protocol commands disabled (subscribe/acknowledge/unsubscribe)
9999	1	Keep alive message

Mapping of ACOP commands to X-PAQ™ inputs [MODIFIED from v4.0.4]

The ASG-NW2500 will trigger the inputs of the X-PAQ™ based on the commands received from the ACOP network. The mapping will be:

X-PAQ™ Input Number							
1	2	3	4	5	6	7	8
Task Selection						Reset	Enable/Disable

The Select Pset command (MID 0018) will change the X-PAQ Inputs 1-6 and can be used for X-PAQ™ Task selection. The inputs will be the binary representation of the selected parameter number.

Task / Pset	IN 1	IN 2	IN 3	IN 4	IN 5	IN 6
0	L	L	L	L	L	L
1	H	L	L	L	L	L
2	L	H	L	L	L	L
3	H	H	L	L	L	L
4	L	L	H	L	L	L
5	H	L	H	L	L	L
6	L	H	H	L	L	L
7	H	H	H	L	L	L
8	L	L	L	H	L	L
9	H	L	L	H	L	L
10	L	H	L	H	L	L
11	H	H	L	H	L	L
12	L	L	H	H	L	L
13	H	L	H	H	L	L
14	L	H	H	H	L	L
15	H	H	H	H	L	L
16	L	L	L	L	H	L
17	H	L	L	L	H	L
18	L	H	L	L	H	L
19	H	H	L	L	H	L
20	L	L	H	L	H	L
21	H	L	H	L	H	L
22	L	H	H	L	H	L
23	H	H	H	L	H	L
24	L	L	L	H	H	L
25	H	L	L	H	H	L
26	L	H	L	H	H	L
27	H	H	L	H	H	L
28	L	L	H	H	H	L
29	H	L	H	H	H	L
30	L	H	H	H	H	L
31	H	H	H	H	H	L

Task / Pset	IN 1	IN 2	IN 3	IN 4	IN 5	IN 6
32	L	L	L	L	L	H
33	H	L	L	L	L	H
34	L	H	L	L	L	H
35	H	H	L	L	L	H
36	L	L	H	L	L	H
37	H	L	H	L	L	H
38	L	H	H	L	L	H
39	H	H	H	L	L	H
40	L	L	L	H	L	H
41	H	L	L	H	L	H
42	L	H	L	H	L	H
43	H	H	L	H	L	H
44	L	L	H	H	L	H
45	H	L	H	H	L	H
46	L	H	H	H	L	H
47	H	H	H	H	L	H
48	L	L	L	L	H	H
49	H	L	L	L	H	H
50	L	H	L	L	H	H
51	H	H	L	L	H	H
52	L	L	H	L	H	H
53	H	L	H	L	H	H
54	L	H	H	L	H	H
55	H	H	H	L	H	H
56	L	L	L	H	H	H
57	H	L	L	H	H	H
58	L	H	L	H	H	H
59	H	H	L	H	H	H
60	L	L	H	H	H	H
61	H	L	H	H	H	H
62	L	H	H	H	H	H
63	H	H	H	H	H	H

Pset selections above 12, 32, or 63 from ACOP will be ignored depending on the Task Mask setting.

Note: Task selection function on the X-PAQ™ through the MID 0018 command requires coordinating Task Selection input programming to be set on each task according to the chart to the right. See the ASG-CT2500 User Manual for more information on input programming of the X-PAQ™.

Additional information

Input 7 will be activated (pulsed) when the Reset Parameter set batch counter command (MID 0020) is received.

Note: Remote Reset of a Task in the X-PAQ™ through the MID 0020 command requires coordinating Remote Reset input programming be set on each applicable task. See the ASG-CT2500 User Manual for more information on input programming of the X-PAQ™.

Input 8 will be <u>deactivated</u> when the Disable tool command (MID 0042) is received and will be again deactivated after the next fastening cycle or when the next ACOP command affecting this byte or batch reset barcode is received.

Note: Remote Halt of a Task in the X-PAQ™ through the MID 0042 command requires coordinating Remote Halt input programming be set on each applicable task. See the ASG-CT2500 User Manual for more information on input programming of the X-PAQ™.

Input 8 will be <u>activated</u> when the Enable tool command (MID 0043) is received and will be cleared after the fastening cycle or when the next ACOP command affecting this byte or batch reset barcode is received.

Note: Enabling the tool (removal of a Remote Halt) in the X-PAQ™ through the MID 0043 command requires coordinating Remote Halt input programming be set on each applicable task. See the ASG-CT2500 User Manual for more information on input programming of the X-PAQ™.

All other commands will be entirely handled by the network card and do not affect the operation of the X-PAQ™.

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ASG, Division of Jergens, Inc.

15700 S. Waterloo Road | Cleveland, OH 44110-3898 | Phone: (888) 486-6163 | Fax: (216) 481-4519 | Email: asginfo@asg-jergens.com | Web: www.asg-jergens.com

EtherNet/IP™ functionality

This chapter describes the assembly object connection points and vendor-specific objects provided by the ASG-NW2500. Implementation was done against EtherNet/IP™ specification edition 1.16 (April 2014) and the associated CIP specification edition 3.16 (April 2014)

EtherNet/IP™ is a proprietary fieldbus protocol, (unlike ACOP) users will not be able to write custom software from scratch to utilize this communication. Connected devices must have EtherNet/IP™ compatibility for integration.

EDS Files

EDS files to assist in integration to compatible equipment are available upon request from ASG, or on the product page of the website for the ASG-NW2500.
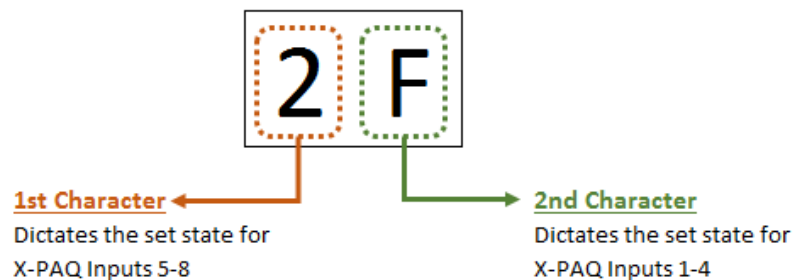
Basic Setup

The procedure required for making an EtherNet/IP™ connection to the ASG-NW2500 will largely depend on the equipment to be connected. In general, most devices will have an option to connect to a "Generic EtherNet/IP™" device. This selection, together with the EDS files and the connection point parameters listed below will assist in setting up a connection.

## Assembly Object Connection Points

This section defines the assembly object connection points provided by the ASG-NW2500 product line. As per the EtherNet/IP™ specification for the Assembly Object, Instance Number and Connection Point are equivalent. This document will refer to them as connection point throughout.

EtherNet/IP™ X-PAQ™ Input Byte

1st Character
Dictates the set state for
X-PAQ Inputs 5-8

2nd Character
Dictates the set state for
X-PAQ Inputs 1-4

Character values may range from 0-9, A-F to cover all binary combinations of the applicable input states.

EtherNet/IP™ X-PAQ™ Output Byte
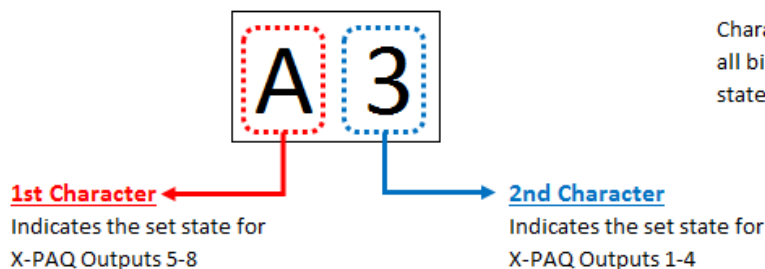
Character values may range from 0-9, A-F to cover all binary combinations of the applicable output states.

1st Character
Indicates the set state for
X-PAQ Outputs 5-8

2nd Character
Indicates the set state for
X-PAQ Outputs 1-4

Data Types

Most data types used correspond to the data types in the EtherNet/IP™ specification and IEC 1131-3. One additional data type is defined for backwards compatibility points:

Name	Size (bytes)	Description
CHAR	1	Character in the ASCII range. Used to indicate fields that should be interpreted as characters rather than numeric values, where USINT would be used instead. When used in an array, indicates a fixed-length string instead of the length prefixed strings defined by the specification.

Fixed-length arrays are represented as TYPE[n] where TYPE is the element type and n is the number of elements.

Device Output Connection Points [Originator ►Target]

These points are used to send data from the network to the X-PAQ™.

Connection point = 150

This connection point corresponds to the default setting of the EtherNet/IP™ network card for the X-PAQ™.

Name	Data Type	Description
X-PAQ™ Inputs	USINT	The inputs to send to the X-PAQ™

Total size: 1 byte

Connection point = 151

This connection point corresponds to the default setting of the EtherNet/IP™ network card for the X-PAQ™.

Name	Data Type	Description
X-PAQ™ Inputs	USINT	The inputs to send to the X-PAQ™
VIN	CHAR[25]	The VIN to be used

Total size: 26 bytes

Input Connection Points (Target ►Originator)

These points are used by the network to get data from the X-PAQ™.

Connection point = 100

This connection point corresponds to the default mask of the EtherNet/IP™ network card for the X-PAQ™ and consists of the following:

Name	Data Type	Description
Parameter	CHAR	'A'-'H'
Tool Type	CHAR[3]	Type of the tool for the current parameter. One of: "DIG" – Digital torque
Tool Name	CHAR[8]	Name of the parameter
Tightening Status	CHAR	Status of the last tightening. One of: 'O' – Good tightening 'N' – Bad tightening
Tightening Type	CHAR	Type of the last tightening. One of: 'B' – Good tightening that finished a batch 'C' – Good tightening that did not finish a batch 'R' – Bad tightening 'N' – No tightening performed since the last parameter change
Count	USINT	The count of the last tightening.
Batch	USINT	The batch size of the last tightening
Rolling Count	UINT	Number of tightenings that have occurred. (big endian)
Total	UINT	Number of batches completed in the parameter. (big endian)
Time	CHAR[6]	ASCII digits of time of last tightening in HHMMSS format.
Date	CHAR[6]	ASCII digits of date of last tightening in MMDDYY format.
EE Time	CHAR[6]	ASCII digits of time of last EEPROM write in HHMMSS format.
EE Date	CHAR[6]	ASCII digits of date of last EEPROM write in MMDDYY format.
Torque	CHAR[6]	ASCII digits and decimal point ('.') representing the value.
Min Torque	CHAR[6]	ASCII digits and decimal point ('.') representing the value.
Max Torque	CHAR[6]	ASCII digits and decimal point ('.') representing the value.
Units	USINT	Character representing the units of the torque.
Angle	CHAR[5]	ASCII digits representing the value.
Min Angle	CHAR[5]	ASCII digits representing the value.
Max Angle	CHAR[5]	ASCII digits representing the value.
X-PAQ™ Outputs	USINT	The current output state of the X-PAQ™ output relays.
Reserved	USINT	Padding byte for devices requiring even connection point sizes

Total size: 79-80 bytes

Connection point = 101

This connection point corresponds to mask 1 of the EtherNet/IP™ network card for the X-PAQ™ and consists of the following:

Name	Data Type	Description
Parameter	CHAR	'A'-'H'
Tightening Status	CHAR	Status of the last tightening. One of: 'O' – Good tightening 'N' – Bad tightening
Tightening Type	CHAR	Type of the last tightening. One of: 'B' – Good tightening that finished a batch 'C' – Good tightening that did not finish a batch 'R' – Bad tightening 'N' – No tightening performed since the last parameter change
Count	USINT	The count of the last tightening.
Batch	USINT	The batch size of the last tightening
Rolling Count	UINT	Number of tightenings that have occurred.
Total	UINT	Number of batches completed in the parameter.
Reserved	USINT	Padding byte for devices requiring even connection point sizes

Total size: 9-10 bytes

Connection point = 102

This connection point corresponds to mask 2 of the EtherNet/IP™ network card for the X-PAQ™ and consists of the following:

Name	Data Type	Description
Tightening Status	CHAR	Status of the last tightening. One of: 'O' – Good tightening 'N' – Bad tightening
Rolling Count	UINT	Number of tightenings that have occurred.
Reserved	USINT	Padding byte for devices requiring even connection point sizes

Total size: 3-4 bytes

Connection point = 103

This connection point corresponds to mask 3 of the EtherNet/IP™ network card for the X-PAQ™ and consists of the following:

Name	Data Type	Description
Parameter	CHAR	'A'-'H'
Tool Type	CHAR[3]	Type of the tool for the current parameter. One of: "DIG" – Digital torque
Tool Name	CHAR[8]	Name of the parameter
Tightening Status	CHAR	Status of the last tightening. One of: 'O' – Good tightening 'N' – Bad tightening
Tightening Type	CHAR	Type of the last tightening. One of: 'B' – Good tightening that finished a batch 'C' – Good tightening that did not finish a batch 'R' – Bad tightening 'N' – No tightening performed since the last parameter change
Count	USINT	The count of the last tightening.
Batch	USINT	The batch size of the last tightening
Rolling Count	UINT	Number of tightenings that have occurred. (big endian)
Total	UINT	Number of batches completed in the parameter. (big endian)
Time	CHAR[6]	ASCII digits of time of last tightening in HHMMSS format.
Date	CHAR[6]	ASCII digits of date of last tightening in MMDDYY format.
EE Time	CHAR[6]	ASCII digits of time of last EEPROM write in HHMMSS format.
EE Date	CHAR[6]	ASCII digits of date of last EEPROM write in MMDDYY format.
Torque	CHAR[6]	ASCII digits and decimal point ('.') representing the value.
Min Torque	CHAR[6]	ASCII digits and decimal point ('.') representing the value.
Max Torque	CHAR[6]	ASCII digits and decimal point ('.') representing the value.
Units	USINT	Character representing the units of the torque.
Angle	CHAR[5]	ASCII digits representing the value.
Min Angle	CHAR[5]	ASCII digits representing the value.
Max Angle	CHAR[5]	ASCII digits representing the value.
XPAQ Outputs	USINT	The current outputs of the XPAQ
VIN	CHAR[25]	Current VIN

Total size: 104 bytes

Connection point = 110

This connection point corresponds to mask 4 of the EtherNet/IP™ network card for the X-PAQ™ and consists of the following:

Name	Type	Description
Tightening ID	UDINT	ID number of the last tightening
Task Number	USINT	Task number. (0 means unknown task running.)
OK	BOOL	
Count	USINT	Number of tightenings performed in the current batch for the task.
Batch	USINT	Number of tightenings required for a batch in the task.
Torque Unit	USINT	Unit used for torque fields 0 – in.lb 1 – ft.lb 2 – N.m 3 – cm.kg 4 – m.kg 5 – cN.m 6 – in.oz
XPAQ Outputs	USINT	The current outputs of the XPAQ.
Timestamp Date	DT	Timestamp of the last tightening
Torque	REAL	Torque of the tightening just performed.
Min Torque	REAL	Minimum torque required for a tightening in the task.
Max Torque	REAL	Maximum torque required for a tightening in the task.
Target Torque	REAL	Target torque for a tightening in the task.
Angle	UDINT	Angle of the tightening just performed.
Min Angle	UDINT	Minimum angle required for a tightening in the task.
Max Angle	UDINT	Maximum angle required for a tightening in the task.
Target Angle	UDINT	Target angle for a tightening in the task.
Prevailing Torque	REAL	Prevailing torque of the tightening just performed.
VIN	CHAR[25]	VIN of the tightening just performed.
Reserved	USINT	Padding to make the overall size even.

Total size: 78 bytes

PROFINET functionality

PROFINET functionality is disabled by default and must be enabled through the menu. Please be aware that when enabling PROFINET, the IP address in the NW2500 will be erased and will either need to be reentered through the menu or set by a PROFINET configuration tool.

Data Format

The below tables show the data available for the input and output slots. The offsets are relative to the start address for each slot's address space.

Tool IO Module Input

Offset	Size	Name	Type	Description
0	4	Tightening ID	UDINT	ID number of the last tightening
4	1	Task Number	USINT	Task number. (0 means task not running.)
5	1	OK	BOOL	
6	1	Count	USINT	Number of tightenings performed in the current batch for the task.
7	1	Batch	USINT	Number of tightenings required for a batch in the task.
8	1	Torque Unit	USINT	Unit used for torque fields 0 – in.lb 1 – ft.lb 2 – N.m 3 – cm.kg 4 – m.kg 5 – cN.m 6 – in.oz
9	1	XPAQ Outputs	USINT	The current outputs of the XPAQ.
10	2	Timestamp Date	DATE	Date portion of timestamp of the last tightening
12	4	Timestamp Time	TOD	Time portion of timestamp of the last tightening
16	4	Torque	REAL	Torque of the tightening just performed.
20	4	Min Torque	REAL	Minimum torque required for a tightening in the task.
24	4	Max Torque	REAL	Maximum torque required for a tightening in the task.
28	4	Target Torque	REAL	Target torque for a tightening in the task.
32	4	Angle	UDINT	Angle of the tightening just performed.
36	4	Min Angle	UDINT	Minimum angle required for a tightening in the task.
40	4	Max Angle	UDINT	Maximum angle required for a tightening in the task.
44	4	Target Angle	UDINT	Target angle for a tightening in the task.
48	4	Prevailing Torque	REAL	Prevailing torque of the tightening just performed.
52	25	VIN	CHAR[25]	VIN of the tightening just performed.
77	1	Reserved	USINT	Padding to make the overall size even.

Total size: 78 bytes

Tool IO Module Output

Offset	Size	Name	Type	Description
0	1	XPAQ Inputs	USINT	The inputs to send to the XPAQ.
1	25	VIN	CHAR[25]	VIN to use for the next tightening

Total size: 26 bytes

Bar Codes *(ACOP Communication Only)*

The bar code functionality of the ASG-NW2500 was developed and tested against the Symbol LS2208 bar code reader, which uses CODE39 bar codes. This format starts and ends all bar codes with an asterisk "*".

Barcodes may be scanned and used to include Product Serial numbers (VINs) into the data output, activate certain MID commands, and program certain data output fields in the ASG-NW2500.

The ASG-NW2500 further specifies a format of data within the bar code. The data is grouped into sections, separated by a percent symbol "%".

The general structure for a command bar code is:

%<command>%<data>%

Note: When setting up the barcode scanner, do not add a carriage return feature as a data suffix.

The following bar code commands are provided:

Cell ID

This command sets the Cell ID reported by the ASG-NW2500 in ACOP result messages.

Command: 01

Data length: 4 characters

Example:

%01%7412%

This bar code would set the Cell ID of the unit to "7412".

Channel ID

This command sets the Channel ID reported by the ASG-NW2500 in ACOP result messages.

Command: 02

Data length: 2 characters

Example:

%02%19%

This bar code would set the Channel ID of the unit to "19".

Controller Name

This command sets the Controller Name reported by the ASG-NW2500 in ACOP result messages.

Command: 03

Data length: up to 25 characters

Example:

%03%STATION 5A%

This bar code would set the Controller name of the unit to "STATION 5A".

VIN

This command sets the VIN or Identifier part 1 reported by the ASG-NW2500 in ACOP result messages, the MID 0052 Vehicle ID Number, and the MID 0152 Multiple identifier and result parts notifications.

Command: 04

Data length: up to 25 characters

Example:

%04%VIN1234567%

As mentioned above, a bar code is assumed to be a VIN number if the data is not in the command format. As such, the same VIN could be provided as:

VIN1234567

Start Job

This command instructs the ASG-NW2500 to begin a pre-defined job. *Jobs are defined using the X-PAQ™ ACOP Manager PC application.*

Command: 05

Data length: up to 2 digits specifying the job number to run (1-99)

Example:

%05%32%

This bar code would instruct the unit to start job number 32.

Identifier part 2

This command sets the Identifier part 2 reported by the ASG-NW2500 in ACOP result messages and the MID 0152 multiple identifier and result parts notifications.

Command: 06

Data length: up to 25 digits.

Example:

```
*%06%B23FJ9S3%*
```

Identifier part 3

This command sets the Identifier part 3 reported by the ASG-NW2500 in ACOP result messages and the MID 0152 multiple identifier and result parts notifications.

Command: 07

Data length: up to 25 digits.

Example:

```
*%07%GU49CN53%*
```

Identifier part 4

This command sets the Identifier part 4 reported by the ASG-NW2500 in ACOP result messages and the MID 0152 multiple identifier and result parts notifications.

Command: 08

Data length: up to 25 digits.

Example:

```
*%08%RU39CN53%*
```

Reset batch count

This command resets the currently running X-PAQ™ task and the batch count on the ASG-NW2500.

Command: 10

Data length: none

Example:

```
*%10%%*
```

Remote Reset via barcode activates an input as described in the "Mapping of ACOP commands to X-PAQ™ inputs" section. With a properly programmed X-PAQ™ inputs, this bar code would reset an X-PAQ™ task.

Select Task

This command instructs the ASG-NW2500 to select a task.

Command: 11

Data length: up to 2 digits specifying the task number to select (0-63)

Example:

||||||| |||||| ||||||| ||||||

%11%7%

Selecting a task via barcode activates inputs as described in the "Mapping of ACOP commands to X-PAQ™ inputs" section. With a properly programmed X-PAQ™ inputs, this bar code would select task 7.

Disable Tool/Remote Halt

This command instructs the ASG-NW2500 to perform a remote halt.

Command: 42

Data length: none

Example:

||||||| |||||| ||||| |||||

%42%%

Remote Halt via barcode activates an input as described in the "Mapping of ACOP commands to X-PAQ™ inputs" section. With a properly programmed X-PAQ inputs, this bar code would halt an X-PAQ™ task.

Enable Tool

This command instructs the ASG-NW2500 to enable the tool (or remove the remote halt).

Command: 43

Data length: none

Example:

||||||| |||||| ||||| |||||

%43%%

Remote Start via barcode activates an input as described in the "Mapping of ACOP commands to X-PAQ™ inputs" section. With a properly programmed X-PAQ inputs, this bar code would enable the SD2500 driver on an X-PAQ™ task.

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Serial Printer

The ASG-NW2500 has a "serial printer" port to which it sends data after each tightening for printing. You may deactivate this function or change the baud rate from the "Serial Printer" entry in the setup menu.

Inside the Serial Printer menu, you may select the baud rate for communications with the serial printer or disable printing. The available baud rates are 9600, 19200, 38400, 57600, and 115200 baud. The serial printer always transmits with 8 data bits, no parity, and 1 stop bit (8N1).

The serial printer prints several fields of information about each tightening on a separate line.

An example result is shown below in Line Format:

```
VIN = [VIN][Identifier 1][Identifier 2][Identifier 3]
Time = [YYYY-MM-DD] [HH:MM:SS]
Task Param = [Task#]
Tool Name = [NAME]
OK/NOK = [O/N]
Result = [CYCLE/REJECT]
Count = [#]
Batch = [#]
Torque Actual = [####.##]
Torque Min = [####.##]
Torque Max = [####.##]
Torque Units = [I/O/K/C/N]
Angle = [#]
Angle Min = [#]
Angle Max = [#]
```

An example result is shown below in CSV Format

```
[VIN][Identifier 1][Identifier 2][Identifier 3],[YYYY-MM-DD]
[HH:MM:SS],[Task#],[NAME],[O/N],[CYCLE/REJECT],[Count#],[Batch
Size],[Torque],[Torque Min],[Torque Max],[Units I/O/K/C/N],
[Angle],[Angle Min],[Angle Max]
```

VIN and Identifier fields are up to 25 characters in length.

Line endings are LF-CR (0x0A 0x0D) and some data fields may have trailing spaces.

USB Data Management

The ASG-NW2500 can perform 3 functions through the USB port:

- Download results and network logs to a USB flash drive.
- Update module firmware from a USB drive.
- USB barcode scanning.

When a USB device is plugged into the unit, it will switch to the USB menu screen, use the arrow keys on the HMI to navigate between submenus and the ENT to make a selection.

Read from USB

The ASG-NW2500 can read firmware updates from the USB drive.

Firmware updates are files with the extension *.bec* and can be uploaded with the process described below.

```
   USB Detected
  Read from USB
```

Contact ASG for current firmware levels and update files.

Firmware Updates
1. If the firmware update file was emailed to you, put it on a USB drive, in the root folder of the drive. If you received the firmware update already on a USB drive, proceed to step 2.
2. Turn on power to the unit and let it go through the startup process.
3. Insert the USB drive into the connector on the unit.
4. Wait for the unit to detect the USB drive. (This may take several seconds.) When the drive is detected, you should see the USB menu. If the unit does not detect the drive, contact support. If the update was emailed to you, you may also try another USB drive.
5. To upload the update to the unit, make sure "Read from USB" is selected and press ENT.
6. The unit will search the root folder of the drive for the firmware update.

```
  Read from USB
  Finding files
```
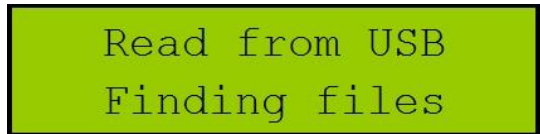
If no valid update file is found, the screen will show an error.

```
  Read from USB
  No file found
```

Otherwise, when a firmware file is detected "Firmware" is displayed on the screen. Press ENT to start the upload.

```
  Read from USB
    Firmware
```
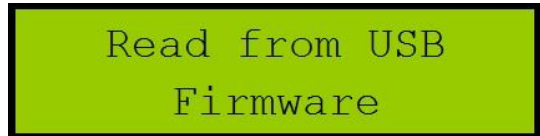
7. When the upload is complete, the unit will restart. At this point, you may remove the USB drive.

Write to USB

The ASG-NW2500 can write its saved tightenings and/or the network log to the USB drive.

Press ENT to enter this menu for the following options, then ENT to select that option.

```
 USB Detected
 Write to USB
```

Tightenings

A results file will be saved to the USB drive as "####res.csv" where #### is the last four digits of the ASG-NW2500 serial number. These files contain all tightening results saved in the unit's memory in a CSV format.

```
 Write to USB
  Tightenings
```

The ASG-NW2500 retains the last 10,000 tightening cycles, then purges first-in/first out to make room for new entries.

Network Log

The network log file will be saved to the USB drive as "####net.g4n" where #### is the last four digits of the ASG-NW2500 serial number. This file contains the network log data in a binary format.

```
 Write to USB
 Network Log
```

This log does not persist across power cycles. The network log is not readable by standard PC programs, and may be requested by service personnel as an aid to troubleshooting in the event of service needs.

All

This option saves both the Tightening results file and the Network Log to the USB drive.

```
 Write to USB
     All
```

Barcode reader

The ASG-NW2500 can accommodate a USB barcode reader through the USB port. Use the arrow keys to select this option and press ENT to confirm to use this option.

```
 USB Detected
 Barcode reader
```

Service and Warranty

Service

Should a product need to be returned for any reason, please contact ASG for a return authorization number prior to shipping an item for repair. Call us at (888) 486-6163 or email us at info@asg-jergens.com

- No items will be received without prior authorization

- Be sure to include a brief description of the problem, your company name, address, phone number and contact name

- An ASG technician will contact you with a quotation and information regarding your repair

Warranty

ASG Precision Fastening warrants to the original purchaser buying an ASG-SD2500 product with the intention of use rather than for resale, for a period of one (1) year from the first in-service date or one million (1,000,000) cycles.

Within the warranty period, ASG Precision Fastening will replace or repair those items found to be defective or otherwise fail to conform. The buyer's remedies with respect to any item found to be defective or otherwise not conforming shall be limited EXCLUSIVELY to the right of replacement. In no event shall ASG be liable for any incidental special or consequential damages or for damages in the nature of penalties.

Disclaimer: Seller makes no other warranty whatever, expressed or implied, and all implied warranties of merchantability and fitness for a particular purpose are disclaimed and excluded from this transaction and shall not apply to the goods sold hereunder.