

GCI
AdaptiCS™



Capabilities Overview

GCI Adaptics

WHAT IT DOES

- **Cell-level assembly validation**
 - In particular: Positional validation
- **Runs on Windows**
- **Integrates devices, eg:**
 - Torque Controller via Open Protocol
 - Encoded GCI torque reaction arms
 - Scanner
 - Vision cameras
 - Digital IO - pass/fail
 - Custom
- **Can be plugged into an MES**
 - Vendors (PINpoint, Catalyst)
 - Custom, in-house (PLC or PC)

WHAT IT DOESN'T DO

- **Coordination of multiple cells (MES)**
- **Collect data**
 - Rundown data is typically stored in the torque controller or forwarded to a database with 3rd party software
- **Flowchart style workflows**
 - Work instructions with decision nodes

Positional Validation

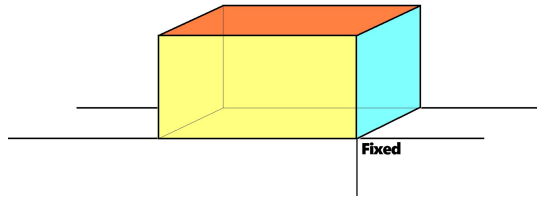
Ensure all fasteners on product are torqued to specification, and enforce order of operations

- Streamlined setup
 - Initial configuration - 20 minutes common
 - New pattern - 5 minutes common
- Proprietary calibration algorithm
 - Improves accuracy, repeatability - 0.1" common
- Fixed (sequential) or Free (any order) mode
- Rework scenarios supported
 - Click fastener on the screen to back out, re-torque
- Multi-rundown
- Inconsistently placed product...



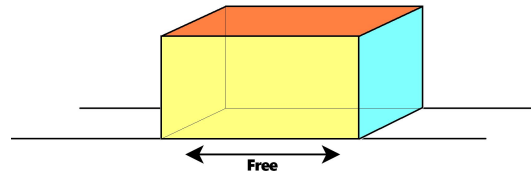
Pattern locate strategies

Consistent



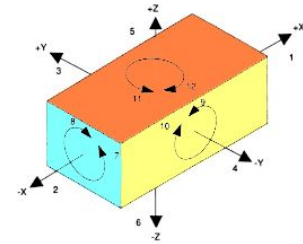
- X/Y/Z position fixed
- Orientation fixed
- Usually - product comes in on rails and rests on a physical stop

Locate with 1 point



- **One** translation dimension inconsistent
- Orientation fixed
- Usually - product comes in on rails but there is no physical stop

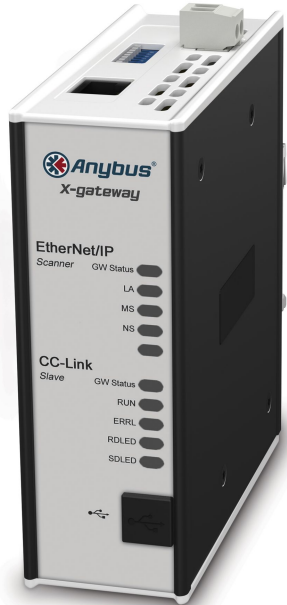
Locate with 2 or 3 points



- More than one translation dimension, or orientation, is inconsistent
- Usually - product is wheeled into station or there is a rollover fixture

PLC interface

- Via Anybus-X Gateway
- Operations
 - Start process
 - Abort process
 - Assign serial number to rundown results
 - Repair only specific fasteners



To Smart Arm:																
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Word 0	Serial Number															
Word 1	Serial Number															
Word 2	Serial Number															
Word 3	Serial Number															
Word 4	Process Number															
Word 5	Tasks Complete															
Word 6	Tasks Complete															
Word 7	Socket Picked															
Word 8																
18 TOTAL BYTES!																
From Smart Arm:																
	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Word 0	Running Process Number															
Word 1	Running Task Number															
Word 2	Socket to Pick															
Word 3																
8 TOTAL BYTES!																

Supporting CANopen, CC Link, ControlNet, DeviceNet, EtherCAT, FIP, Interbus, LonWorks, Modbus, Profinet, ModbusTCP, AS-I, Ethernet/IP

...but you might not need it

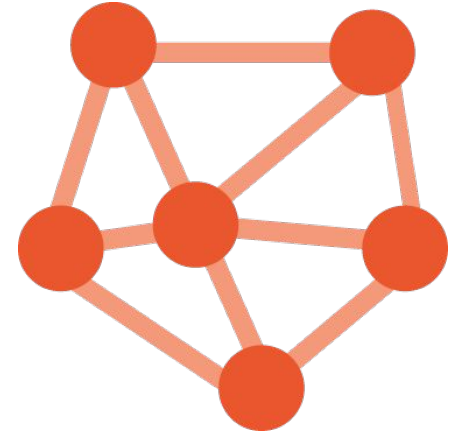
With “passive” mode, the torque controller can act as an intermediary.

- PLC or other system selects a Job or Parameter set in torque controller
- Adaptics is notified and enforces positional constraints.



Web Service API (PC interface)

- Via Ethernet network
- Supports:
 - 3rd party MES packages
 - In-house software
- Operations
 - Run/Abort Process
 - Validate/Invalidate Tasks
 - Subscribe to feedback events (eg “Task Complete”)
 - Manipulate the Adaptics user interface



Plugins



Standard

- **Scanner**
 - Process selection
 - Component validation
- **Vision systems**
 - Cognex, Keyence
 - Component validation
- **Custom arm style**
- **Digital input**
 - Click wrench, etc...

Custom

- **Other device integration**
- **Anybus modifications**
- **Read/write to customer-maintained DB**
 - User badge validation
 - Component barcode validation
 - Insert data
- **User interface modifications**

Other notes

- Multi-spindle supported
- Able to run without regard to position (bolt counting with visual feedback)
- Always-on tracing system to diagnose errors
- Separate operator/supervisor authorizations
- Data can be “tagged” to torque controller rundown records
 - Process name
 - Serial number
 - Task name
 - Custom