Gizmo Return Kit Preparation (How To)

Following is a summary of what your hub needs to do to put a Return Kit together.

Refer to the annual Consumables&Returnables ordering XLS for a bill of materials for the Returnable Kit. There are multiple sources for Returnable Kit components except for the Gizmo pc board. Some assembly and/or modifications are required for certain components. Some software components may require an annual update (typical) or an unscheduled update to resolve a critical must-fix issue.

The Returnable Kit is INTENDED to be returned at the conclusion of the BEST competition. Hubs may choose to donate these kits to participating teams if their funding permits; be aware that the following tasks will need to be repeated for each NEW Returnable kit that is prepared.

ONE-TIME PREPARATIONS

Required Assembly:

- Assemble Driver Station components.
  - PI Zero 2, USB/ETH hat + enclosure, microSD card
  - New microSD card is delivered from BRI (annually) for firmware updates
  - Instructions
- Assemble Gizmo switch assembly.
  - 16 gauge red/black wire + household switch + powerpole connectors
  - /Hub Operations/Kits/Annual Kit Preparation/Gizmo Control System
- Assemble Gizmo board.
  - Gizmo pcb + PICO-H + PICO-WH + enclosure
  - /Hub Operations/Kits/Annual Kit Preparation/Gizmo Control System
- Change 7.2V battery connectors to Anderson powerpole.
  - /Hub Operations/Kits/Hub Conversions & Modifications
- Create battery charger adapters (kyosho to powerpole).
  - /Hub Operations/Kits/Hub Conversions & Modifications
- Assemble sensor and motor cables.
  - Place the wires into one side of the terminal block and screw them down.
- Assemble 1 IR sensor kit (transmitter/receiver pair) per team; you will distribute 1 assembled and 2 unassembled in each Returnable Kit
  - Instructions
- Select a mix of 5 servo horns (large round, small round, 4-arm, 6-arm).

Required Software Loads:

- Load the system processor firmware image to Gizmo system processor.
  - Instructions
- Load the BEST default program onto Gizmo student processor.
  - Document: TBD

- Load the driver station firmware image onto microSD card; we suggest making spares.
    - Only necessary if a firmware upgrade is due.
    - Instructions
- Configure driver station for team specific use.
    - Generate (gizmo tool) or download (from National Registry) the gssconfig.json file and copy it to the team specific driver station microSD card. Label the SD card and/or driver station.
    - Instructions

Optional Assembly (Hub Discretion):

- You may optionally pre-solder wires with connectors to the motors.
- Hubs may choose to pre-assemble a motor screw terminal cable and MC-29 motor controller with a wire-tie or heat shrink tubing. This is left up to the hub to decide. Teams can do it just as easily if needed.
- Strain relief the screw terminal connections with hot glue or silicon.
- Package your parts, label, and stuff your kits for distribution as you see fit.

ANNUAL PREPARATIONS (Test & Refurbish)

Required:

- Charge 7.2v NiMh batteries.
- Charge the USB power bank (for driver station).
- Image and configure any new driver station microSD cards.
- Download BEST default code to the Gizmo student processor.
    - MAIN / Hub Operations / Robot Software.

Recommended (Hub Discretion):

- See optional assembly.
- Bind/Pair the driver station and Gizmo (via USB).

Recommended Testing (returned parts):

Motor Controller 29, 7.2v 4A	Check for electrical function in both directions.
Large Motor	Measure free-spinning amps to measure health. Tighten screws. Size the RAZZ bearing on motor shaft to check fit.
Small Motor	Measure free-spinning amps to measure health.
7.2V 3000 to 3800 mAhr NiMH battery - modified with powerpole connectors	Discharge/charge cycle to ensure they maintain adequate capacity. Discard if mAhr < 2000.
Screw Terminal sensor interface cable (3 wire)	Check connections if pre-assembled.
Screw Terminal motor interface cable (2 wire)	Check connections if pre-assembled.
Futaba S3003/S3004/SU300 or HiTech HS-422/HS-425BB Servos	Spin horn manually to check for damaged gears (not powered). Check for electric function.

24” Servo extension (600mm also allowed)	All cables, pull through fingers to check for cuts. Plug in end-to-end to check for sloppy connections.
BEST IR Sensor Kit (one assembled)	Student assembled. Verify function of any returned assembled kits.
Metal Wheel Hubs	Can ¼” rod be inserted? Do set screws turn freely?
¼” shaft coupler with set screws	Can ¼” rod be inserted? Do set screws turn freely?