

GRAPPLE SCANNER FOR RADIATION IN SCRAP METAL

Model Series ~ GRAPPLE SCAN- GR

Models ~ GRAPPLE SCAN- GR-A, -B, -C, & -D

FEATURES:

- WIRELESS COMMUNICATION BETWEEN DETECTOR & CRANE OPERATOR
- SURFACE SCAN, LOAD ANALYSIS, SEARCH MODES
- FAST SCAN, REAL TIME ALARM
- NO MOVING PARTS – QUICK CHANGE DETECTOR BETWEEN GRAPPLE HOUSINGS
- DETECTS – ALL RADIOACTIVE MATERIALS, SOURCES & CONTAMINATION
- GAMMA & NEUTRON
- FITS TO ANY GRAPPLE
- ARMORED, SHOCK MOUNTED, WATERPROOF
- RE-CHARGEABLE BATTERY OPERATED
- MORE SENSITIVE THAN VEHICLE MONITORS
- SIMPLE OPERATION
- EASILY SORTS CLEAN LOADS VERSUS CONTAMINATED LOADS
- **OPTIONAL:** WIRELESS REMOTE ALARM AND DISPLAY TO BASE STATION



DETECT & REJECT CONTAMINATED SCRAP METAL

ADVANTAGES:

- ALL LOADS ARE SCANNED, (Not just a few random samples).
- No additional handling.
- Contaminated material is spotted early.
- Suspicious scrap metal can be separated easily.
- Reliably Detects **CFR 49C: Hazard Class 7** (Radioactive Material).
- High sensitivity because Detector Assembly is so close to material!

SITUATION:

Large volumes of scrap metal are moved from truck to ship to railcar to foundry in the US and around the world. It is essential to know which scrap metal, if any, carries Radioactive Materials.

Doing a manual search of large amounts of metal is not feasible for many reasons. Technical Associates' Model **GRAPPLE SCAN-GR SERIES** of radiation detectors provides highly sensitive information from a Quick scan.

DESCRIPTION:

Detector Assembly is positioned inside a Fixed Armored Housing approximately 1 square foot up to 16 sq foot, depending on available space.

IMMEDIATE DATA on radioactive content of the entire grapple contents is transmitted to the Operators Console.

Having a Fixed Detector Housing mounted directly on the Grapple Crush Plate with the Detector Assembly safely inside has distinct advantage for seeing radioactive scrap material over vehicle or portal monitors.

Detecting & Rejecting Contaminated Scrap Metal:

Radioactive material can enter the scrap metal supply in various ways. For example:

- A radiotherapy cancer treatment source is lost or stolen and may be present
- Diffuse radioactive materials become mixed with, or even enter the metal matrix of the scrap metal.



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METHOD OF USE:

- **Grapple Mounted:**

- The Fixed Detector Housing is mounted inside the jaws of the grapple on the crush plate (or on a crane or a spreader bar.)
- The Detector Assembly is placed within the Detector Housing so that it views the metal content from above.
- Electronics Assembly consists of Transmitter & Battery Pack. It is mounted on fixed plate above the Grapple Claw.
- The Electronics Assembly is positioned in Armored Housing & is connected to the Detector Assembly via an Armored Cable to provide wireless data transmission to the operator's console.

Crane Operators Console in the Cab:

- The **Operator Console** provides data information & easy switching between Surface Scan, Load Analysis, & Search modes.



Model	GRAPPLESCAN-GR-A	GRAPPLESCAN-GR-B	GRAPPLESCAN-GR-C	GRAPPLESCAN-GR-D
Gamma Detector:	1 each large plastic Scintillator	1 each large plastic Scintillator	2 each large plastic Scintillator	2 each large plastic Scintillator
Typical Size:	12" x 12" x 7" (1ft ²)	24"x24"x7" (4 ft ²)	36" x 36" x 7" (9 ft ²)	48"x 48"x 7" (16 ft ²)
Neutron:	YES: ZnS(Ag)	YES: ZnS(Ag)	YES: ZnS(Ag)	YES: ZnS(Ag)

Protective Armor: Detector Assembly has high strength, protective armor shield
Unique design allows good sensitivity even for lower energy Gammas and Neutrons

DETECTOR SPECIFICATIONS:

Sensitivity: Can Alarm at 7 µR/hr rise within a few seconds (Ratemeter Mode).
Can Alarm down to 1 µR/hr with longer count time.

Range: 1 µR/hr to 1 mR/hr

Energy Range: Gamma – 100KeV to 6 MeV

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DETECTOR ASSEMBLY ON GRAPPLE:

- Located in Fixed Armored Housing on Each Grapple Crush Plate with Easy Detector Assembly Access
- Each Detector Assembly is Located in its own Rugged Housing
- Each Detector Assembly has preamp and HV plus counter
- Each Detector Assembly is connected to Transmitter via Quick Connect Armored Cable no Tools Required.
- Switching Detector Assemblies between Fixed Housing on Different Grapples is Quick with Standard Tools.

ELECTRONICS ASSEMBLY ON GRAPPLE:

- Located above Grapple Claw on Fixed Mounting Plate
- Electronics Assembly consists of Transmitter & Battery Pack
- Battery Pack Switch Out - Quick with no Tools Required
- Switching Electronics Assembly between Grapples - Quick with Standard Tools
 - Disconnect Transmitter from Detector Assembly via Quick Connect Armored Cable – No Tools Required
 - Remove Electronics Assembly and Relocate on Different Grapple Fixed Mounting Plate.

CHOICE OF MATERIALS: Fixed Detector Housing is available -in Steel or Titanium

ELECTRONICS ON GRAPPLE:

Transmitter Housing:

Armored, Removable, Quick Connect – Standard Tools,

Transmitter Cable:

Armored between Transmitter & Detector – Quick Connect – No Tools

Communication:

Wireless Transmitter from Grapple Detector Assembly to Crane Operator Console via WLAN (WiFi) and/or Bluetooth

Bluetooth: Class 1, 100mW, 100 Meter Max

Battery Life:

Re-Chargeable via AC Lithium Ion available with 10 to 72 Hours capacity

OPTIONAL:

Trickle Recharge from crane battery

OPTIONAL:

Additional Re-Chargeable Battery Packs

OPTIONAL Sensors:

Temperature, impact, motion, GPS



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ELECTRONICS IN OPERATORS CONSOLE:

Display:	Alarm Status: (3) Radiation Level Indicator Lights – Green, Orange, Red Count rate Self-Test
Display:	Color, Touch Sensitive
Setting:	Level of Confidence choice of engineering units and other parameters
Memory:	On-Board Memory Sufficient for 1 Year of Data
Processor:	High Speed
Communication:	Each Crane Console (Node) has its own unique IP address WiFi: Grapple Detector Assembly to Operator Console
OPTIONAL Base Station	For short distances from Operator Console to base station: via WLAN
Communication:	For long distance: Cell Phone Modem to Satellite to Ground Station



RUGGEDIZED DETECTOR ASSEMBLY SPECIFICATIONS:

Temperature Range:	Per Customers Request
Vibrations:	5G RMS on 3 axis
Shocks:	Will Withstand Severe Impact
Environmental:	All Rugged detectors meet the IP 54 spec. IP 68 can be included per request
Salt Spray	Immune

SEARCH MODE:

Looking for a highly-radioactive pellet source; the Grapple with Detector Assembly can be moved at a reasonable speed over one or more piles of scrap in Ratemeter mode to pinpoint the location of the radiation source.

LOAD ANALYSIS:

When scrap is picked up and held inside the jaws of the Grapple and transported from one location to another, the close proximity of the metal to the Detector Assembly and subsequent longer time in such proximity allows the highest sensitivity. If it exceeds the alarm set point the operator will divert the load to a separate location for rejected material.

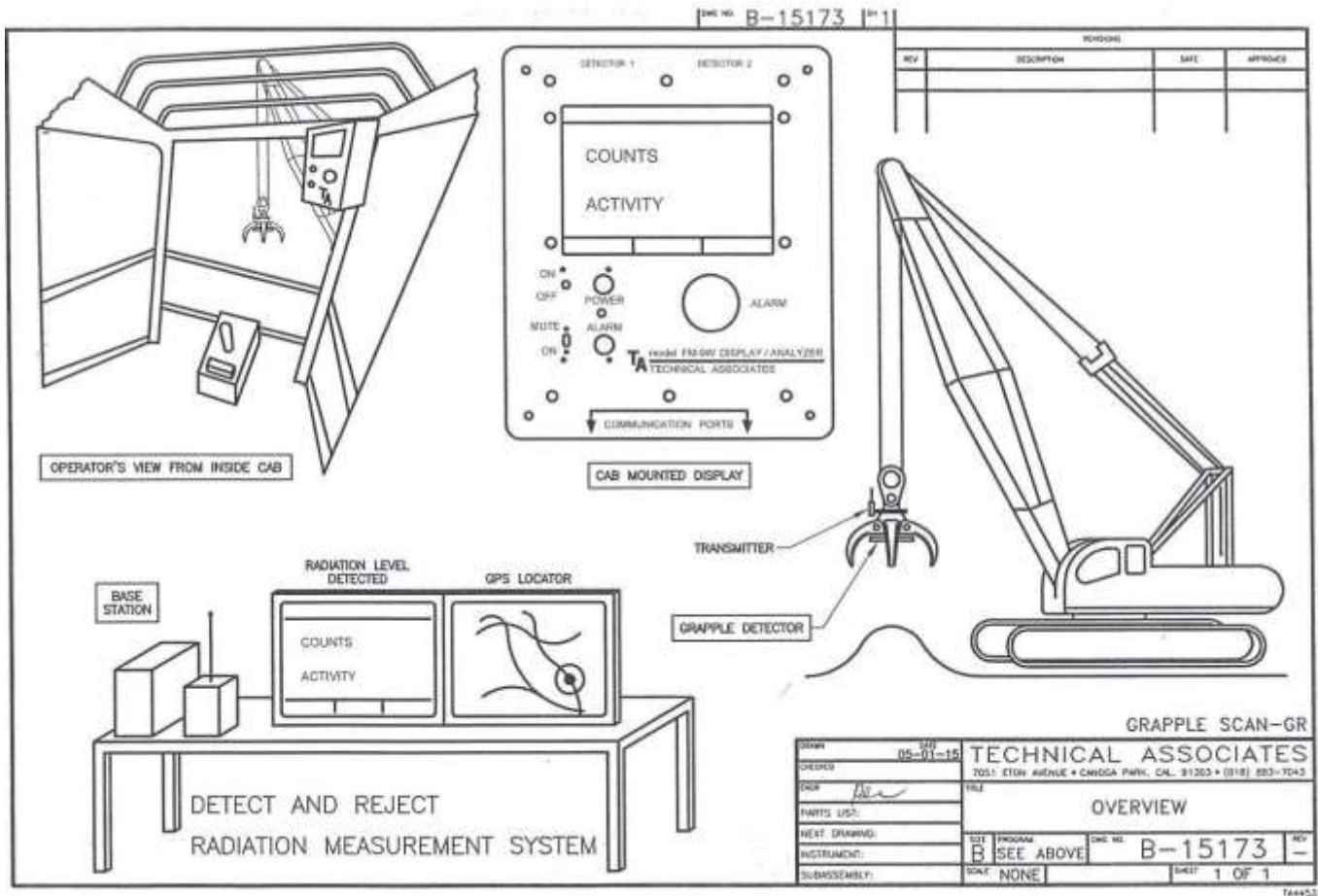
SURFACE SCAN:

Although the Load Analysis gives the highest sensitivity, Mid-Level sensitivity is achieved as the Grapple hovers over the material. This provides the opportunity for Mid-Level contamination to be detected and recorded and then passed over. This saves labor and time. It alerts user to the contamination, but does not mix it with the clean scrap.

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GRAPPLE DETECTOR OVERVIEW



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