GE Energy

HYDRAN® 201*i* System
Technical Specifications

Contents

Hydran® 201T*i* Intelligent Transmitter

The HYDRAN® 201T*i* continuous on-line Intelligent Transmitter is a small, cylindrical, thermally controlled enclosure installed on a valve of the transformer to be monitored. It contains the HYDRAN® sensor with its microprocessor based electronics. It is used in conjunction with the H201C*i*-1, H201C*i*-4 or the H201C*i*-C controllers. It is housed in a NEMA 4X instrument enclosure.

HYDRAN® products meet the intent of Directive 89/336/EEC for Electromagnetic Compatibility.

EN 50082-1 Immunity:
IEC 801-3 RF Radiated
IEC 801-4 Fast Transients

General

Instrument Components
Sensor and micro-electronic transmitter in cylindrical enclosure

Responds to
H_2, CO, C_2H_2, C_2H_4 (hydrogen, carbon monoxide, acetylene, ethylene)

Medium
Electric insulating oil

Application
Transformer monitoring: specifically, detection of failure conditions in oil-filled electrical equipment; upgrading or expansion of existing H201R installations

Analytical Performance

Sensor Principle
Selective gas permeable membrane and combustible gas detector

Measurement Method
Flooded port with Dynamic Oil Sampling system

Sampling/Bleeding Port
5/32-inch Allen screw, fits glass syringe with Luer stopcock

Range
0-2000 ppm (Volume/Volume, H_2 equivalent); other ranges available

Accuracy for 0-2000 ppm Range
± 10 % of reading ± 25 ppm (H_2 equivalent)

Relative Sensitivity to H_2
Reading = 100 % of H_2 concentration

Relative Sensitivity to CO
Reading = 18 % ± 3 % of CO concentration

Relative Sensitivity to C_2H_2
Reading = 8 % ± 2 % of C_2H_2 concentration

Relative Sensitivity to C_2H_4
Reading = 1.5 % ± 0.5 % of C_2H_4 concentration

Sensor Response Time
10 minutes (to 90 % of step change)

Electronic Unit (Overview)

Hardware
Microprocessor, watchdog and time-of-day clock

Software
Real-time operating system and menu-driven interface

Functions

Gas level, hourly and daily trends (adjustable); gas level, gas trends and fail alarms; history logging; periodic sensor test; calibration, configuration and self-test; networking; modem control; remote software upgrading

Communications

One port, user selectable as local RS-232 (DB-9) or isolated supervisory link

Display

Backlit LCD, 2 lines by 16 characters

Keypad

6 keys (Enter, Up, Down, Change, Escape, End)

Alarm Contacts

Gas Hi, Gas Hi-Hi, Fail SPDT (type C), 60 W, 125 VA, 220 Vdc, 250 Vac

Standard Local Analog Output

0-1 mA non-isolated output, 2 V max. output, 0-2000 ppm range

Output Option

Available as 4-20 mA isolated output, 1500 V RMS; 10 V max. output, 0-2000 ppm (must be specified at ordering time, no retrofit)

Miscellaneous

External Enclosure

NEMA-4X (IP-66) 178 mm (7-inch) diameter x 180 mm (7 1/8-inch) white cylindrical aluminum housing, 257 mm (10 1/8-inch) overall length

Electronic Modules

CPU and I/O modules totally encased; swappable and weatherproof

Enclosure Heating/Cooling

325 W heating plate plus convection cooling maintain sensor and electronics within temperature range of 15 to 65 °C (59 to 149 °F)

Enclosure to Valve Mounting

Brass adaptor with 1.5-inch NPT male thread screws to customer valve (standard); 1-inch

and 2-inch adaptors and a 1-inch finned high temperature adaptor are optional

Operating Temperature Range

Oil at the valve: -50 to +90 °C (-58 to +194 °F); +105 °C (+221 °F) with optional finned high temperature brass adaptor. Ambient: -50 to +55 °C (-58 to +131 °F)

Oil Pressure Range

0 to 700 kPa (100 psi) gauge pressure; no vacuum allowed

Power Requirements

100 / 115 / 200 / 230 Vac, ± 10 %, 50 / 60 Hz, 350 VA maximum; 100 Vac compliant with EN 61010

EMI / RFI / ESD Compatibility

Meets IEEE C37.90 and IEC 255-4, 801-2, 801-4 standards

Weight

Installed: 6 kg (13 lbs)
Shipping: 7.3 kg (16 lbs)

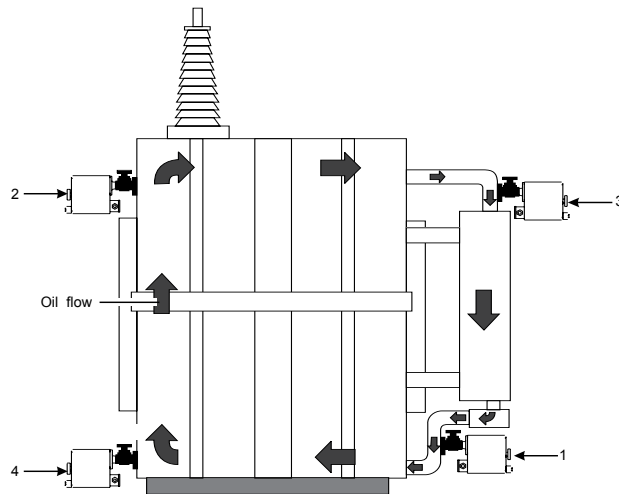## HYDRAN® 201T*i* Location and Installation

For meaningful system readings and good response time, the two most important factors are proper location and installation of the HYDRAN® 201T*i*. The following details important considerations for the installation of the H201T*i*:

1. Mount the H201T*i* on a full-bore gate valve (preferred) or a ball valve where there is a good forced or convective oil flow.

2. Install the H201T*i* on a valve with a diameter of 38 mm (1.5-inch).

The recommended location to mount the H201T*i* is on a straight section of the cooler return pipe, and on the discharge side of the pump if present. This location presents the sensor with the best combination of oil flow, operating temperature range and ease of access.

Recommended Locations

1. Bottom of cooler
2. Upper filling valve or tank wall valve
3. Top of cooler
4. Drain valve

Note: Regardless of the selected location, it is recommended that the H201T*i* be mounted horizontally.

*For other locations, consult General Electric Canada

Typical HYDRAN® 201*i* System Installation

- The H201C*i* Controller enclosure is a NEMA 4X (IP 66) type and can be installed outdoors.

- It should be mounted on a vibration-free structure, or installed on vibration-absorbing mounts (available from General Electric Canada).

- The cabinet should be placed at eye level and such that the door can be fully opened.

- Access to the cable bulkhead fittings, on the bottom of the cabinet, should not be restricted.

- Good grounding of the electronics cabinet and its supporting structure is essential to avoid erratic behavior caused by electromagnetic and radio-frequency interferences.

Typical HYDRAN® 201*i* System Installation

1. H201C*i*-1 enclosure, installed on anti-vibration mounts
2. Full-bore gate or ball valve
3. H201T*i* Intelligent Transmitter
4. Supervisory link cable in steel conduit
5. H201T*i* supply cable in steel conduit
6. Current loop and communication output cable in steel conduit
7. Alarm cable in steel conduit and/or steel flexible (to customer alarm panel)
8. H201C*i*-1 enclosure supply cable in steel conduit
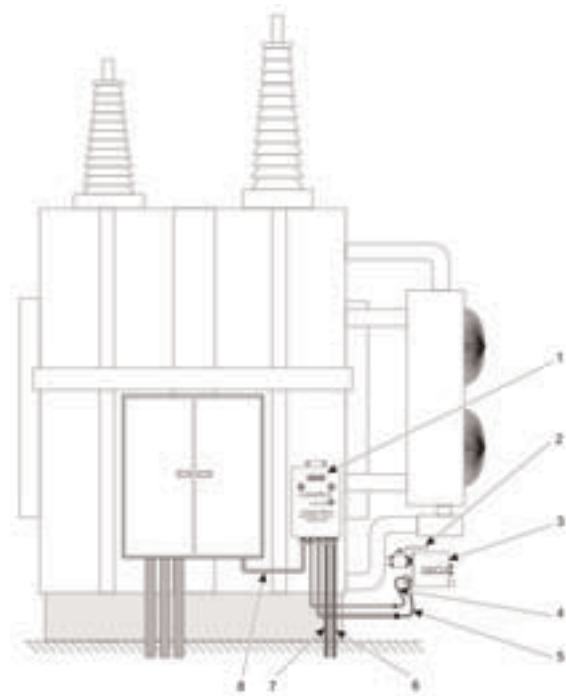
HYDRAN® 201C*i*-1 One Channel Controller

Remote electronic controller for one HYDRAN® 201T*i* Intelligent Transmitter; it provides network communication capabilities plus a large display of gas level as well as alarm contacts, alarm indicators and analog outputs.

** When ordered in conjunction with a H201T*i*, this combination is commonly referred to as a HYDRAN® 201R Model *i*.

General

Components
Electronic unit housed in a weatherproof enclosure, suitable for outdoor installation

Application
Monitoring of one H201T*i* Intelligent Transmitter and access point for a network up to 128 H201T*i*'s via a single RS-232 computer communication port, either locally or through an optional modem

Electronic Unit

Display Type
Digital, Light Emitting Diodes (LED), 0-1999 ppm

Standard Analog Output
Non-isolated, jumper-configurable as 0-1 mA or 4-20 mA (10 V max. output), 0-1 V or 0-10 V; 0-2000 ppm scale

2nd Optional Analog Output
Isolated, jumper-configurable as 0-1 mA, 4-20 mA, 0-1 V or 0-10 V; 1500 V RMS isolation level; 0-2000 ppm scale

Gas Hi and Hi-Hi Alarms
Duplicate alarms in the H201T*i* for Level, Hourly Gas Trend and Daily Gas Trend

Fail Alarm
Duplicates alarm in the H201T*i* for power failure, loss of communications, sensor or other system malfunctions; upon system fault, display is blanked and analog outputs are set to zero

Alarm Contacts
Gas Hi, Gas Hi-Hi, Fail SPDT (type C), 125 VA @ 250 Vac, 60 W @ 220 Vdc

Gas Alarm Indicators
Hi and Hi-Hi illuminated pushbuttons mounted on door; latched on when alarm is triggered, turned off by pressing button as alarm is cleared

Communications/Networking

Supervisory Link Port
3000 V opto-isolated supervisory link port connects with H201T*i*; 1300 m (4000 ft) maximum length; three twisted pairs (AWG #16 or #18) with overall shield required

RS-485 Communication Port
Standard RS-485 communication port allows for daisy-chaining of up to 32 H201C*i*-1's (or H201C*i*-C's or H201C*i*-4's); 1300 m (4000 ft) maximum total daisy-chain length; one twisted triad (AWG #16 or #18) with overall shield required

RS-232 Local Port
Standard RS-232 port (DB-9) allows serial communications with a local computer (or remote computer with optional smart modem); any H201T*i* can be accessed through any H201C*i* Controller

Supervisory Link Power Supply
A separate isolated dc power supply provides +15 V (impedance protected) for the opto-isolated supervisory link

Recommendation
Run all communication cables in flexible or rigid metallic conduits for maximum mechanical and electrical protection

Miscellaneous

Enclosure
NEMA 4X (IP 66) steel enclosure; baked enamel, textured white finish

Dimensions
Approximately 250 x 350 x 200 mm (10 x 14 x 8 inch)

Operating Temperature Range
-50 to +55 °C (-58 to +131 °F) with standard internal heater

Power Requirements
100 / 115 / 200 / 230 Vac, ± 10 %, 50 / 60 Hz, less than 120 VA; 100 Vac compliant with EN-61010

EMI / RFI / ESD Compatibility
Meets IEEE C37.90 and IEC 255-4, 801-2, 801-4 standards

Weight
Installed: 10 kg (22 lbs)
Shipping: 11 kg (24 lbs)

HYDRAN® 201C*i*-4 Four Channel Controller

Remote electronic controller with digital display for up to four HYDRAN® 201T*i* Intelligent Transmitters; it provides

network communication capabilities plus a large display of gas level as well as alarm contacts, LED alarm indicators, LED status indicators and optional analog outputs.

General

Components
Electronic unit housed in a weatherproof enclosure, suitable for outdoor installation

Application
Monitoring of up to four H201T*i*, or of a network of up to 128 H201T*i*'s via a single RS-232 computer communication port, either locally or through an optional modem

Electronic Unit

Display Type
Digital, Light Emitting Diodes (LED), 0-1999 ppm which scrolls each channel and is lockable on a specific H201T*i* channel for single channel monitoring. Plus 16 high-intensity LED's to reflect the status of each H201T*i* independently (4 LED's per channel). Information displayed is H201T*i* identification, alarm Hi, alarm Hi-Hi, and Fail Alarm.

Optional Isolated Analog Output
Order H201C*i*-4 Extended Version: Isolated, jumper-configurable as 0-1 mA, 4-20 mA, 0-1 V or 0-10 V; 1500 V RMS isolation level

Gas Hi and Hi-Hi Alarms
Duplicate alarms in the H201T*i* for Level, Hourly Gas Trend and Daily Gas Trend

Fail Alarm
Duplicates alarm in the H201T*i* for power failure, loss of communications, sensor or other system malfunctions; upon system fault, display is blanked and optional analog outputs are set to zero

Standard Alarm Contacts
Gas Hi, Gas Hi-Hi, Fail SPDT (type C), 125 VA @ 250 Vac, 60 W @ 220 Vdc; dry contacts common to the four channels available in the H201C*i*-4. Upon an alarm the contacts will reflect the status of the H201T*i* with the highest priority alarm.

Optional Alarm Contacts
Order H201C*i*-4 Extended Version: Gas Hi, Gas Hi-Hi, Fail SPDT (type C), 125 VA @ 250 Vac, 60 W @ 220 Vdc; dry contacts for each of the H201T*i* alarms independently

Gas Alarm Indicators
Hi and Hi-Hi illuminated pushbuttons mounted on door; latched on when alarm is triggered, turned off by pressing button as alarm is cleared

Communications/Networking

Supervisory Link Port
3000 V opto-isolated supervisory link port connects with H201T*i*; 1300 m (4000 ft) maximum length; three twisted pairs (AWG #16 or #18) with overall shield required

RS-485 Communication Port
Standard RS-485 communication port allows for daisy-chaining of up to 32 H201C*i*-4's (or H201C*i*-C's or H201C*i*-1's); 1300 m (4000 ft) maximum total daisy-chain length; one twisted triad (AWG #16 or #18) with overall shield required

RS-232 Local Port
Standard RS-232 port (DB-9) allows serial communications with a local computer (or remote computer with optional smart modem); any H201T*i* can be accessed through any H201C*i* Controller

Supervisory Link Power Supply
A separate isolated dc power supply provides +15 V (impedance protected) for the opto-isolated supervisory link

Recommendation
Run all communication cables in flexible or rigid metallic conduits for maximum mechanical and electrical protection

Miscellaneous

Enclosure
NEMA 4X (IP 66) steel enclosure; baked enamel, textured white finish. Rackmountable model available, please specify at ordering time.

Operating Temperature Range
-50 to +55 °C (-58 to +131 °F) with standard internal heater

Power Requirements
100 / 115 / 200 / 230 Vac, ± 10 %, 50 / 60 Hz, less than 120 VA, 100 Vac compliant with EN 61010

EMI / RFI / ESD Compatibility
Meets IEEE C37.90 and IEC 255-4, 801-2, 801-4 standards

HYDRAN® 201C*i*-C
Communications Controller

Remote electronic controller for the HYDRAN® 201T*i* Intelligent Transmitter; it provides network communication capabilities for groups of one to four H201T*i*.

General

Components
Electronic unit housed in a weatherproof enclosure, suitable for outdoor installation

Application
Monitoring of up to four H201T*i*, or of a network of up to 128 H201T*i*'s via a single RS-232 computer communication port, either locally or through an optional modem

Electronic Unit

Function
Management of communications data flow between isolated supervisory link to H201T*i*, RS-485 network of H201C*i*-C (or H201C*i*-1, or H201C*i*-4) Controllers and RS-232 computer port

Display
None

Analog Outputs
None

Alarm Contacts
None

Communications/Networking

Supervisory Link Port
3000 V opto-isolated supervisory link port connects with up to four H201T*i*; 1300 m (4000 ft) maximum length; two twisted pairs (AWG #16 or #18) with overall shield required

RS-485 Communication Port
Standard RS-485 communication port allows for daisy-chaining of up to 32 H201C*i*-C's (or H201C*i*-1's or H201C*i*-4's); 1300 m (4000 ft) maximum total daisy-chain length; one twisted triad (AWG #16 or #18) with overall shield required

RS-232 Local Port
Standard RS-232 port (DB-9) allows serial communications with a local computer (or remote computer with optional smart modem); any H201T*i* can be accessed through any H201C*i* Controller

Supervisory Link Power Supply
A separate isolated dc power supply provides +15 V (impedance protected) for the opto-isolated supervisory link

Recommendation
Run all communication cables in flexible or rigid metallic conduits for maximum mechanical and electrical protection

Miscellaneous

Enclosure
Baked powder paint, NEMA 4X (IP 66) steel enclosure; textured beige finish

Dimensions
Approximately 200 x 300 x 120 mm (8 x 12 x 5 inch)

Operating Temperature Range
-50 to +55 °C (-58 to +131 °F) with standard internal heater

Power Requirements
100 / 115 / 200 / 230 Vac, ± 10 %, 50 / 60 Hz, less than 120 VA, 100 Vac compliant with EN 61010

EMI / RFI / ESD Compatibility
Meets IEEE C37.90 and IEC 255-4, 801-2, 801-4 standards

Weight
Installed: 5.5 kg (12 lbs)
Shipping: 6.5 kg (14 lbs)

HYDRAN® HOST Software

General Electric Canada's HYDRAN® HOST software provides a simple interface between one or more HYDRAN® 201T*i* Intelligent Transmitters and an IBM PC (or compatible), through a RS-232 serial communication link. Optional modems allow the communication to be carried over public telephone lines. The HYDRAN® HOST software performs five basic tasks:

- A continuous, on-line survey of alarm status and basic information from one or several H20IT*i* by the host computer

- Real-time logging of information from one or several H201T*i* by the host computer

- Continuous or programmed uploading of historical data from one or several H201T*i* networks to the host computer with graphic display

- Downloading and uploading of configuration data to one or several H201T*i* from/to the host computer

- H201T*i* embedded program upgrading of one or several H201T*i* from the host computer
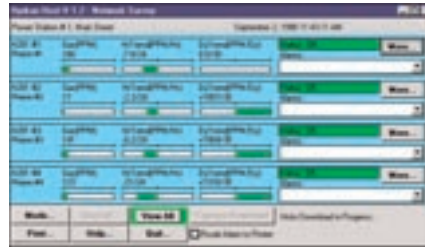
The HYDRAN® HOST software package contains:

- Three 3.5-inch disks

- One 6-foot RS-232 standard communication cable with DB-9 female connectors at both ends

- One instruction manual

System Requirements

- IBM PC 486, Pentium or 100 % compatible personal computer

- Microsoft Windows® 3.1, 95/98, NT 4.0, 2000 or XP

- 8 Meg (Microsoft Windows® 3.1) or 16 Meg (Microsoft Windows® 95/98) or 32 Meg (Microsoft Windows® NT 4.0) of available RAM memory; hard disk with 10 Meg of free space + 0.4 Meg per H20IT*i* per month

- VGA (640 x 480) graphics adaptor and monitor

- A mouse is highly recommended to take full advantage of the easy-to-use graphical interface

- A Microsoft Windows® compatible printer (optional)

Software Features

- Microsoft Windows® based application

- Easy installation and configuration

- Mouse and/or keyboard operated

- RS-232 communication protocol

- Support for serial ports COM1, COM2, COM3 and COM4

- Support for modern

- Baud rates of 1200, 2400, 4800 or 9600

- Continuous downloading of historical data from each H201Ti to a Microsoft Access® database, with facility to export to ASCII file (for spreadsheets)

- Multi-site capabilities

- Background alarm monitoring

- Graphic display of data

- One-screen network overview

Note: The H201i System alarm relay contacts should be wired to the station's alarm panel to allow detection of alarm conditions when the HYDRAN® HOST software is not running or attended to.

Recommended Accessories

The following accessories are available for the H201i System. These accessories may be ordered with any of the H201i System components or separately.

H200i Electronic Calibrator

The H200i calibrator is used during the verification and calibration procedures for the H201Ti electronics. One H200i calibrator per site is recommended.
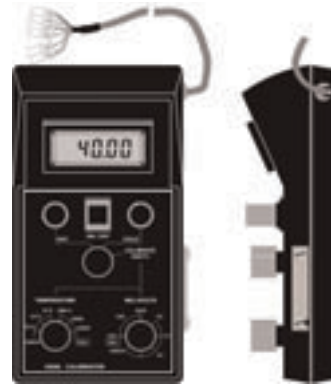
H201-TW Tube Wrench

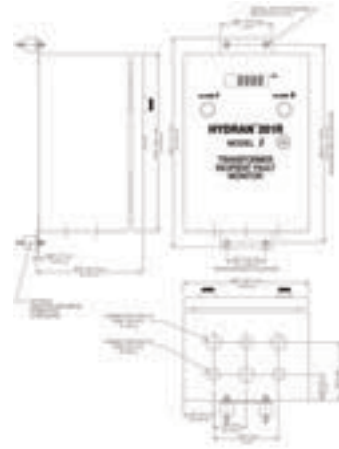The Tube Wrench is required for proper installation of the H201 sensor. One Tube Wrench per site is recommended.
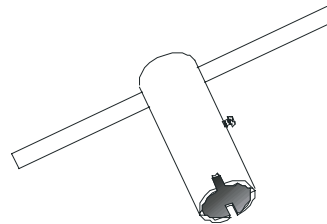
Vibration-Absorbing Rubber Pads

If vibrations are present, these rubber pads are used to mount the H201Ci electronic enclosure (four pads per set).
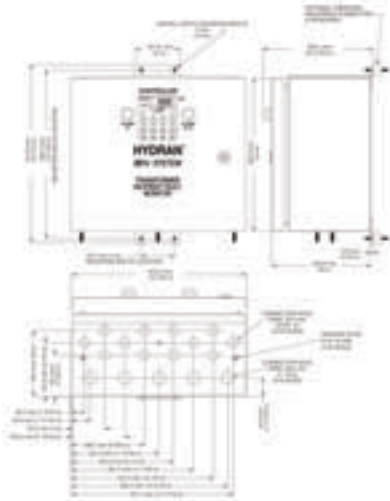
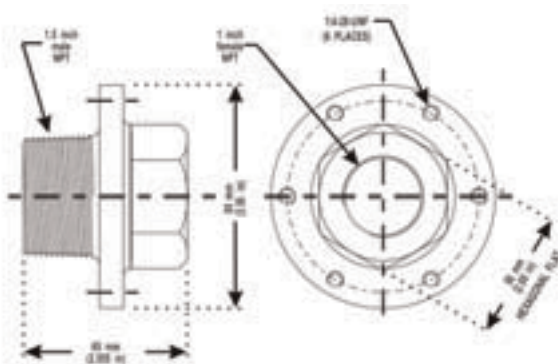## HYDRAN® 201T*i* TRANSMITTER
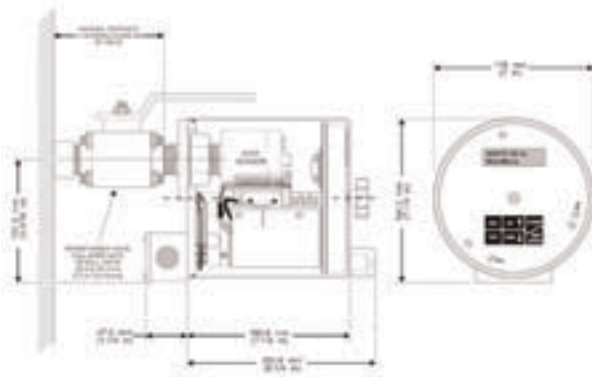
HYDRAN® 201C*i*-1 CONTROLLER
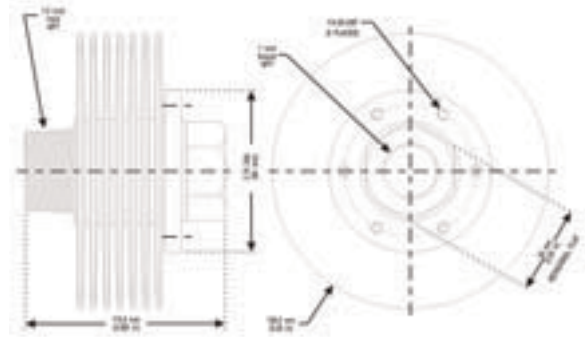

HYDRAN® 201C*i*-4 CONTROLLER

HYDRAN® 201C*i*-C CONTROLLER

STANDARD VALVE ADAPTOR

FINNED HIGH TEMPERATURE ADAPTOR

GE Energy

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