ENRAF TANK FARM GATEWAY CIU 888
The next generation CIU for reliable, accurate gauge and inventory data

Honeywell
Honeywell’s Enraf Tank Farm Gateway CIU 888 is the critical link between tank gauging equipment and control room systems. It provides the operator with reliable, accurate, real-time tank inventory data 24 hours a day, 7 days a week. Replacing the legacy 858 and 880 series, the CIU 888 serves as the data acquisition unit for tank measurement equipment, continuously scanning gauge data. It is used to calculate accurate tank inventory data according to international standardized calculation methods, such as the API, ASTM, GPA and many others.

All measured and calculated data is directly available for use by host applications such as the inventory management system, the DCS or management information system via multiple dedicated serial host links and network interfaces. Support of multiple protocols guarantees simple and reliable connectivity of installed field equipment to the control room. The modular design provides a flexible upgrade path for the future.

**ENHANCED CONNECTIVITY**

The CIU 888 (pronounce as “triple eight”) series is the first fully Ethernet enabled CIU available in the market. While previous generations of tank interface units have been based mostly on serial interfaces, the CIU 888 offers connectivity via multiple Ethernet ports. Internal firewalls enable safe and secure connections with multiple systems simultaneously, control systems and Office LAN cannot interfere due to strict segregation. A dedicated service LAN port on the front provide technicians easy access to configure the unit locally and to communicate with the field equipment. Also here the layered security model (LCSM), with user and access profiles, helps to promote safety and security.

The CIU 888 robustness is based on strict industrial design rules. All boards are tropicalized (acc. ISA 71.04), and the CAE thermal design using heat-pipes instead of conventional fans results in a full ruggedized, all-solid-state, non-moving parts solution, built to last. Unique redundancy features will ensure uninterrupted data availability to all users. Redundant Ethernet ports complete the redundancy concept, simplifies implementation further reducing costs and ensure uninterrupted availability of data.

An easy-to-read colour display at the front provides diagnostic information, easy to
interpreted, supporting faster service. The graphic diagnostic dashboard combined with a ring of light (a color-coded LED ring surrounding the key pad) provides an at-a-glance and unambiguous indicator of system health and availability.

Front view (with closed door)
- LCD color display for status and diagnostics
- Convenient lid automatically covers access to Service- and USB-port and keys for Configuration lock and W&M sealing
- Navigation keys and ring of light showing CIU status

Rear view (left to right)
- Two serial host ports: Compatible with Entis Pro
- VGA & Audio (future use)
- Two USB ports: Auto-disabled (future use)
- 5 dedicated Ethernet ports, segregated by Firewall
- 6 flexible field and Host communication ports

Modbus TCP/IP communication between the CIU 888 and the host systems is established through FTEA, FTEB and Office LAN ports. CIU 888 exposes the same data (Modbus maps) over the Ethernet host ports as that exposed in the serial host ports.

TECHNICAL SPECIFICATIONS—FUNCTIONAL (SOFTWARE)

GENERAL
Description
Field scanning and communication interface for tank inventory applications with optional embedded tank inventory calculation functionality.

Application
For all applications requiring accurate and reliable process and inventory data, such as refineries, tank farms and terminals. Data is suitable for custody transfer, safe product transfer and tank farm operation.

Intended Use
Control room equipment

Legal Metrology and Custody Transfer
Compliant to API-standards as stated by approval and certification by notified bodies as NMI.

FUNCTIONAL SPECIFICATION
Tank Database
80 tanks

Redundancy
Hot standby, real-time synchronization (redundancy controlled by Entis Pro or modbus host)

Supported Gauge Models
All GPU enabled tank gauges (such as 811, 813, 866, 854, 872, 873, 877, 894, 990, 954 & Emerson TRL/2)

Gauge Commands
- Lock test
- Unlock
- Block
- Freeze
- Calibrate (854, 894)
- Density dip
- Alarm test (SmartRadar)
- Water dip

Tank Scanning
6 field ports sequential and/or parallel, refresh rate 2-4 sec.

Inventory Calculations
Conform API MPMS Ch. 12.1

Tank Capacity Tables (strapping tables)
Up to 5000 straps per tank, 400000 straps total

Support API/ASTM Product Calculations
- ASTM D1250-80; conform Vol X—Tables, 5, 6, 23, 24, 53, 54, 59, 60 and 59, 60 Commodities
- Product groups A, B, C & D
- API MPMS Ch. 11.1 (2007; adj. to ASTM D1250-04 and IP-200)—Tables, 5, 6, 23, 24, 53, 54, 59, 60 and 59, 60, Product groups A, B, C, D
- API MPMS Ch. 11.2.4 (GPA TP-27)—Tables, 5, 6, 23, 24, 53, 54, 59, 60 and 59, 60, Product group E
- ASTM D4311-83—Tables 1 and 2
- ASTM D4311-96—Table 1
- ASTM D4311-04—Tables 1 and 2

Available Gauge Data
- Product level
- Product temperature
- Vapor pressure
- Water level
- Temperature Profiles

Available (Calculated) Inventory Data
- Volume (TOV, GOV, GSV, NSV)
- Mass (Liquid, vapor, total)
- Volume correction factor (VCF, CTL)
- Volume derived flow

(cont. next page)
### FUNCTIONAL SPECIFICATION (CONT.)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clock &amp; Time Synchronization</td>
<td>External using Entis Pro or Modbus host systems such as DCS</td>
</tr>
<tr>
<td>Supported Engineering Units</td>
<td>Level: m, mm, ft, in, in/16 and ft-in-16 (fs)</td>
</tr>
<tr>
<td></td>
<td>Temperature: °C, °F</td>
</tr>
<tr>
<td></td>
<td>Density: kg/m³, °API, lb/ft³, RD60/60, lb/USgal</td>
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<tr>
<td></td>
<td>Pressure: kgf/cm², kPa, psig, Pa</td>
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<tr>
<td></td>
<td>Volume: m³, USgal, bbl, L/L</td>
</tr>
<tr>
<td></td>
<td>Mass/Weight: kg, lb, metric ton, long ton, US ton</td>
</tr>
<tr>
<td></td>
<td>Flow: m³/min, m³/h, l/min, bbl/min, bbl/h, USgal/min, USgal/h, UKgal/h</td>
</tr>
</tbody>
</table>

### Available Tank Correction Methods
- CTSH³
- Floating Roof Weight

### Temperature and Density Profiles
- Temperature profiles - Periodic scanning of temperature profiles data up to 16 points from BPM and TRL/2 gauges and presentation in Modbus output (RTU and TCP/IP) based on configuration.
- Density profiles - Density profiles data collection up to 10 density points from Honeywell Servo gauges and presentation in Modbus output (RTU and TCP/IP) based on user command.

### HOST CONNECTIVITY

<table>
<thead>
<tr>
<th>Serial Ports</th>
<th>2x modbus serial (+ 4 additional ports by using optional slots)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supported Host Protocols</td>
<td>• Serial modbus (Slave)</td>
</tr>
<tr>
<td></td>
<td>• CIU 858 emulation</td>
</tr>
<tr>
<td></td>
<td>• CIU 888 Prime/Plus emulation (serial modbus)</td>
</tr>
<tr>
<td>Ethernet/LAN</td>
<td>3x Modbus TCP/IP ethernet (FTEA, FTEB and Office LAN)</td>
</tr>
</tbody>
</table>

### FIELD CONNECTIVITY

| Field Ports | 6x option slots (of which 4 ports can be used for serial host connectivity) |
| Wireless Connectivity | ISA 100 via Honeywell WDM through TCP/IP to serial converters |
| Available Option Boards | Enraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus |

### COMPLIANCE & CERTIFICATIONS

| Electrical Safety | • IEC 61010-1:2010 (3rd edition) |
| | • EN 61010-1:2010 |
| European Directives | CE: |
| | • 2006/95/EC (Low voltage directive) |
| | • 2004/108/EC (EMC) |
| | • CAN/CSA-C22.2 No. 61010-1-12 |
| | • UL Std. No. 61010-1 (3rd Edition) |
| Self Monitoring & Diagnostics | Designed for compliance with NAMUR NE 107 |
| Legal Metrology (Weight & Measures) | • NMI – Netherlands |

### CIU 888 OPTION BOARD SPECIFICATIONS

<table>
<thead>
<tr>
<th>ENRAF BPM FIELD BUS CARD (POS 8 TO 13 = B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Layer</td>
</tr>
<tr>
<td>Supported Protocol(s)</td>
</tr>
<tr>
<td>Typical No. Field Devices</td>
</tr>
<tr>
<td>Baud Rate</td>
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<tr>
<td>Distance</td>
</tr>
<tr>
<td>Cable Characteristics</td>
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<tr>
<td>Type of Galvanic Isolation</td>
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<tr>
<td>Galvanic Isolation</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>TRL/2 FIELD BUS CARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Layer</td>
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<tr>
<td>Supported Protocol(s)</td>
</tr>
<tr>
<td>Typical No. Field Devices</td>
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<td>Baud Rate</td>
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<tr>
<td>Type of Galvanic Isolation</td>
</tr>
<tr>
<td>Galvanic Isolation</td>
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</tbody>
</table>

Footnote: ¹ Depending on number of used field ports, scan strategy, and baud rate. ² Depending on gauge functionality. ³ Ambient temperature input required.
**TECHNICAL SPECIFICATIONS—HARDWARE**

### ELECTRICAL

- **Power Supply**: 100-240 Vac, auto ranging (-15% to +10%), 45-65 Hz
- **Power Rating**: Max. 60 VA (35 VA nominal)
- **Nominal Start-Up Current**: 60 mA (Fuse: 2A Slow Blow); Start up current is (inrush): 60mA @230V
- **Over Voltage Category**: II (EN60664-1 : 2007)
- **Cooling System**: 2 heat sinks with heat pipe design (no moving parts)
- **Battery Type**: 3V, 225mAh (for back-up system clock only—10 yrs. estimated life time)

### OPERATING SYSTEM

- **O/S**: Linux Arch
- **Memory**: 4 GB Flash memory (upgradable)

### USER INTERFACE AND I/O

- **Front Panel Display**: Backlight LCD color display (50 x 38 mm; 320 x 240 pixels) for status and diagnostics
- **User Input**: 6 switches (f, g, h, i, OK and Esc) with LED (ring of light) status indication
- **Key Lock Switches**: 2x (for configuration, resp. W&M sealing)
- **Serial Ports**: 2x non-isolated RS-232C
- **Ethernet Ports**: 5x 10/100 Mb on back side (future use)
- **Service Ethernet Port**: 1x behind front panel—DHCP enabled, auto sensing, 10/100 Mb

### ENVIRONMENTAL

- **Ambient Temperature**: 0 °C to + 60 °C (32 °F to 140 °F)
- **Storage Temperature**: -20 °C to 85 °C (-4 °F to 185 °F)
- **Enclosure Classification**: Against mechanical impact IP 30 (NEMA 1)
- **Humidity**: 0 to 90% non-condensing
- **EMC Class**: CLASS A according to IEC61326 & OIML R85: 2008

### MECHANICAL

- **Materials**:
  - Enclosure: Acryl painted steel
  - Heat sinks (left and right side): Black anodized aluminum
  - Front panel: ABS/PPE
- **Dimensions (WxHxD)**: 400 x 93 x 283 mm (15¾ x 3¾ x 11¼ in.)
- **Weight**: ~ 7.5 kg (16.5 lb) (excluding option cards)
- **Installation**: Wall mounting, 19” rack or table top (see Accessories)
- **Max. Load on Top (Table Top Use)**: 10 kg (22.0 lb)

### AVAILABLE ACCESSORIES

- **19” installation bracket**: Part no. A0888904
- **Wall mounting bracket**: Part no. A0888903
- **Set Ethernet Cables**: Part no. A0889911
- **Set Ethernet cables**: Part no. A0889911

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Color</th>
<th>Length</th>
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</thead>
<tbody>
<tr>
<td>1 SYNC link</td>
<td>Orange</td>
<td>1 meter</td>
</tr>
<tr>
<td>2 FTE</td>
<td>Yellow/Green</td>
<td>3 meter</td>
</tr>
<tr>
<td>1 LAN</td>
<td>Blue</td>
<td>2 meter</td>
</tr>
<tr>
<td>1 Remote Access</td>
<td>Red</td>
<td>3 meter</td>
</tr>
<tr>
<td>1 Service Port</td>
<td>Grey</td>
<td>3 meter</td>
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</tbody>
</table>
### Identification Code — Hardware Configuration

#### Pos 1 Application
- **For Inventory Control of Bulk Storage Tanks**
- **Compliant with National Legal Metrology Requirements (specify country)**

#### Pos 2 Base Configuration Hardware
- CIU for Tank Inventory Management

#### Pos 3 Memory
- 4 GB Flash

#### Pos 4 Selection
- CIU 888 Hardware Configuration

#### Pos 5, 6, 7 Product designation
- Communication Interface Unit

#### Pos 8 Field Card Slot 1
- **Not Used**
- Serial Modbus Input (Master)
- TRL/2 Fieldbus
- Enraf Fieldbus (BPM)
- Serial GPU (Input)

#### Pos 9 Field Card Slot 2
- **Not Used**
- Serial Modbus Input (Master)
- TRL/2 Fieldbus
- Enraf Fieldbus (BPM)
- Serial GPU (Input)

#### Pos 10 Field and Host Communication Slot 3
- **Not Used**
- Serial Modbus Input (Master)
- TRL/2 Fieldbus
- Host Serial Modbus (Slave)
- Enraf Fieldbus (BPM)
- Serial GPU (Input)

#### Pos 11 Field and Host Communication Slot 4
- **Not Used**
- Serial Modbus Input (Master)
- TRL/2 Fieldbus
- Host Serial Modbus (Slave)
- Enraf Fieldbus (BPM)
- Serial GPU (Input)

#### Pos 12 Field and Host Communication Slot 5
- **Not Used**
- Serial Modbus Input (Master)
- TRL/2 Fieldbus
- Host Serial Modbus (Slave)
- Enraf Fieldbus (BPM)
- Host CIU Emulation
- Serial GPU (Input)

#### Pos 13 Field and Host Communication Slot 6
- **Not Used**
- Serial Modbus Input (Master)
- TRL/2 Fieldbus
- Host Serial Modbus (Slave)
- Enraf Fieldbus (BPM)
- Host CIU Emulation
- Serial GPU (Input)

#### Pos 14 Extended Memory
- **Not Installed**

#### Pos 15 Tag Plate
- **Not Required**
- Tag Plate Sticker Added

#### Pos 16 Not Used
- **Not Used**

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**Typical Identification Code**

<table>
<thead>
<tr>
<th>1</th>
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<th>3</th>
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<tbody>
<tr>
<td>U</td>
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</tbody>
</table>

**Your Identification Code**
### Identification Code CIU 888 — Software Functionality 888

**Pos 1 Application**
- General purpose
- Legal Metrology Approved (NL)
- None (used in combination with Pos 20, in case Pos 1 doesn’t need an upgrade)

**Pos 2 Base Configuration Software**
- Single CIU System
- Redundancy Enabled Per Unit
- None (used in combination with Pos 20, in case Pos 2 doesn’t need an upgrade)

**Pos 3 Functionality**
- According Standard

**Pos 4 CIU Type**
- Tank Gauging Software Functionality

**Pos 5, 6, 7 Product designation**
- Communication Interface Unit

**Pos 8, 9 Interfacing and Calculations**
- Scanning Functionality
- Scanning with integrated Volume Calculation module
- None (used in combination with Pos 20, in case Pos 8,9 doesn’t need an upgrade)

**Pos 10 Web Monitoring**
- Configuration and Diagnostics only

**Pos 11 Host Communication OPC**
- No OPC-server

**Pos 12 Host Communication Modbus TCP/IP**
- Not Enabled
- Standard Ethernet (Modbus slave)

**Pos 13 Host Communication Fault Tolerant Ethernet**
- Not Enabled

**Pos 14 Remote Diagnostics**
- Not Enabled

**Pos 15 Temperature Profile**
- Not Enabled
- Temperature profile

**Pos 16 Density Profile**
- Not Enabled
- Density profile

**Pos 17, 18 Number of Tanks**
- Each tank can be configured with one tank level gauge.

**Pos 19 Language**
- English

**Pos 20 Upgrade**
- New CIU ordering
- Upgrade (Serial number of CIU and License required)

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**Typical Identification Code**

```
S F 8 8 8     S Z Z Z Z Z Z         Z N
```

**Your Identification Code**

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1 Each tank can be configured with one tank level gauge.
Overall Dimensions
All dimensions in mm (in.)

For More Information
To learn more about Honeywell’s Tank Gauging Solutions, visit www.honeywellprocess.com or contact your Honeywell account manager.

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