# ENRAF TANK FARM GATEWAY CIU 888

The next generation CIU for reliable, accurate gauge and inventory data



# **GLOBAL EXPERIENCE.** LOCALLY APPLIED.

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 tropcalized (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.



Distributed Control and Supervision (DCS)

#### 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 communi embedded tank inventory cal	cation interface for tank invent culation functionality.	ory applications with optional
Application	For all applications requiring ac farms and terminals. Data is su	ccurate and reliable process and itable for custody transfer, safe p	inventory data, such as refineries, tank product transfer and tank farm operation.
Intended Use	Control room equipment		
Legal Metrology and Custody Transfer	Compliant to API-standards as	s stated by approval and certific	ation by notified bodies as NMI.
FUNCTIONAL SPECIFICATION			
Tank Database	80 tanks (one gauge per tank 40 tanks (two gauges per tan	) k)	
Redundancy	Hot standby, real-time synchr	onization (redundancy controll	ed by Entis Pro, ENTIS or modbus host)
Supported Gauge Models	All GPU enabled tank gauges (su	uch as 811, 813, 866, 854, 872, 8	73, 877, 894, 990, 954) & Emerson TRL/2
Gauge Commands	Lock test	• Unlock	• Block
	• Freeze	• Calibrate (854, 894)	• Density dip
	Alarm test (SmartRadar)	• Water dip	Density profile
Tank Scanning	6 field ports sequential and/o	r parallel, refresh rate 2-4 sec. <sup>1</sup>	
Inventory Calculations	Conform API MPMS Ch. 12.1		
Tank Capacity Tables (strapping tables)	Up to 5000 straps per tank, 4	00000 straps total	
Support API/ASTM Product Calculations	<ul> <li>ASTM D1250-80; conform \ Product groups A, B, C &amp; D     </li> <li>API MPMS Ch. 11.1 (2007; 60 and 59, 60; Product groups A, B, C, D     </li> <li>API MPMS Ch. 11.2.4 (GPA<sup>-1</sup> </li> <li>ASTM D4311-83—Tables 1     </li> <li>ASTM D4311-96—Table 1     </li> <li>ASTM D4311-04—Tables 1     </li> <li>ASTM D4311-15     </li> <li>ASTM D4311M-15     </li> <li>ASTM D1555-16     </li> <li>ASTM D1555M-16     </li> </ul>	Vol. X—Tables, 5, 6, 23, 24, 53, 54 adj. to ASTM D1250-04 and IP IP-27)—Tables, 5, 6, 23, 24, 53, and 2 and 2	4, 59, 60 and 59, 60 Commodities 2-200)—Tables, 5, 6, 23, 24, 53, 54, 59, 54, 59, 60 and 59, 60; Product group E

Notes:

<sup>1</sup>Depending on number of used field ports, scan strategy, and baud rate.

Support Other Product Calculations              = NILER OLS 31 (Municula Subject Calculations)               Subject Calculations Subject Calculations            Medious TOP/P one / or OPCUATOP              Subject Calculations Subject Calculations	FUNCTIONAL SPECIFICATION (C	ONT.)		
SGS-21 (Ammonia)         NRERGAGE-16 (Ehamol / Alcoho)         User configurable Charabi / Alcoho)         Available Gauge Data"       • Cauge status and alarms         Product temperature       • Vapor temperature         Vapor pressure       • Arnh ent temperature         • Vapor temperature       • Observed density (Fordis)         • Product temperature       • Observed density (Fordis)         • Product pressure       • Observed density (Fordis)         • Product pressure       • Observed density (Fordis)         • Product pressure       • Vapor temperature         • Valume (100 COV CSV NSV)       • Mass (1 kiud vapor temp)         • Product pressure       • Volume derived flow         Clock & Time Synchronization       Extendi using Entits Prof. ENTIS or Moduus host systems such as DCS         Supported Engineering Units       Evel       mr.mt.t.in/16 and th-n-16 (fits)         • Prosure       90,************************************	Support Other Product Calculations	<ul> <li>EN15940-19 (Hydrogenated Vegetable Oil)</li> <li>SGS-21 (Ammonia)</li> <li>NBR15639-16 (Ethanol / Alcohol)</li> <li>User configurable density table</li> <li>User configurable CTL table</li> <li>User configurable concentration table</li> <li>EN15940-19 (Hydrogenated Vegetable Oil)</li> </ul>		
Available Gauge Dats <sup>2</sup> <ul> <li>Product temperature</li> <li>Vapor pressure</li> <li>Vapor pressure</li> <li>Vaber temperature</li> <li>Vapor pressure</li> <li>Observed density (Sevo, HTG, HIMS)</li> <li>Temperature Profiles</li> <li>Density Profiles</li> <li>Product pressure</li> <li>Floating roof levels</li> <li>Valume (TOV, GOV, GSV, MSV)</li> <li>Mass (Liquid, vapor, total)</li> <li>Reference density</li> <li>Volume (TOV, GOV, GSV, MSV)</li> <li>Vass (Liquid, vapor, total)</li> <li>Reference density</li> <li>Volume carrection factor (VCF, CTL)</li> <li>SSW Vapor (4 types), DCF, TCF, manual CTL</li> <li>Volume derived Tow</li> <li>Volume carrection factor (VCF, CTL)</li> <li>SSW Vapor (4 types), DCF, TCF, manual CTL</li> <li>Volume derived Tow</li> <li>Volume carrection factor (VCF, CTL)</li> <li>SSW Vapor (4 types), DCF, TCF, manual CTL</li> <li>Volume derived Tow</li> <li>Volume Carrection factor (VCF, CTL)</li> <li>Ressure CR</li> <li>Pressure CR</li> <li>Pressure CR</li> <li>Pressure CR</li> <li>Volume</li> <li>Mass/Weight</li> <li>Ressure Vapor</li> <li>Volume Correction Methods</li> <li>Pressure CRH</li> <li>Serve Wine carrection</li> <li>Pressure CRH</li> <li>Serve Wine carrection</li> <li>Pressure CRH</li> <li>Serve Mine carrection in Moduus output (RTU and TE/R) and OPOP Unput based on user correnand and reges and presentation in Moduus output (RTU and TE/R) and OPOP Unput based on user correnand PRU and Serve Topopressure profiles - Density profiles data upto 16 ports fr</li></ul>		<ul> <li>SGS-21 (Ammonia)</li> <li>NBR15639-16 (Ethanol / Alcohol)</li> <li>User configurable density table</li> <li>User configurable CTL table</li> <li>User configurable concentration table</li> </ul>		
<ul> <li>Product temperature</li> <li>Vapor temperature</li> <li>Ambient temperature</li> <li>Ambient temperature</li> <li>Conserved density (Serve, HTG, HIMS)</li> <li>Temperature Profiles</li> <li>Density Profiles</li> <li>Product pressure</li> <li>Floating root levels</li> <li>Product pressure</li> <li>Volume (TOX, GOX, GSV, MSV)</li> <li>Mass (Lajud vapor, total)</li> <li>Preference density</li> <li>Volume (TOX, GOX, GSV, MSV)</li> <li>Volume derived flow</li> <li>Volume derived flow</li> <li>Seaw Vapor (4 types), DCF, TCF, manual CTL</li> <li>Volume derived flow</li> <li>Volume derived flow</li> <li>Seaw Vapor (4 types), DCF, TCF, manual CTL</li> <li>Volume derived flow</li> <li>Colock &amp; Time Synchronization</li> <li>Extend using Entis Pro, ENTIS or Modbus hots + stems such as DCS</li> <li>Supported Engineering Units</li> <li>Level</li> <li>Imperature</li> <li>QC, 9F</li> <li>Pressure</li> <li>Rayff, "API, Ib/f1, PD60, Ib/USgal</li> <li>Pressure (AM</li> <li>Volume</li> <li>Mass (Lajub, DB1, TL)</li> <li>Mass (Lajub, DB1, TL)</li> <li>Mass (Melght</li> <li>Row</li> <li>Normin, m7A, fumi, Ibd/m, Ibd/m, USgal/min, USgal</li></ul>	Available Gauge Data <sup>2</sup>	Product level	Gauge status and alarms	
<ul> <li>Vapor pressure</li> <li>Vapor pressure</li> <li>Observed feasity (Servo, HTG, HIMS)</li> <li>Description</li> <li>Description</li> <li>Description</li> <li>Reading continues</li> <li>Final protities</li> <li>Product pressure</li> <li>Final protities</li> <li>Final protit</li></ul>		Product temperature	Vapor temperature	
<ul></ul>		Vapor pressure	Ambient temperature	
• Temperature Profiles         • Density Profiles           • Product pressure         • Reating modifiends           Available (Calculated) Inventory Data         • Volume (TOV, GOV, GSV, NSV)         • Mass (Liquid, vapor, total)           Reference density         • Volume correction factor (VCF, CTL)         • S8W, Vapor (4 types), DCF, TCF, manual CTL         • Volume derived flow           Clock & Time Synchronization         External using Entis Pro, ENTIS or Moabus host systems such as DCS         • Mass (Liquid, vapor, total)           Supported Engineering Units         Level         m.mm, ft.n. in/16 and ft-in-16 (fis)           Pressure         kg/km <sup>3</sup> , vAP, Ib/ft <sup>3</sup> , RD60, Ib/USgat           Pressure         kg/km <sup>3</sup> , vAP, Ib/ft <sup>3</sup> , RD60, Ib/USgat           Pressure         kg/km <sup>3</sup> , vAP, Ib/ft <sup>3</sup> , RD60, Ib/USgat           Yolume         m <sup>3</sup> , USgat, Ib, UIC, I           Mass/Weight         kg, Ib, metric ton, long ton. US ton           Flow         m <sup>3</sup> min, m <sup>3</sup> n, J/min, Ib/mi, Ib/Mi, USgat/min, USgat/min, USgat/h, UKgat/h           Available Tank Correction Methods         • CTSh <sup>3</sup> • Floating Roof Weight         • Femperature or Offices canning of temperature profiles data up to 16 points from BPM           • Pressure GRH         • Pressure GRH         • Pressure GRH           • Pressure GRH         • Pressure GRH         • Pressure GRH           • De		• Water level	Observed density (Servo, HTG, HIMS)	
<ul></ul>		Temperature Profiles	Density Profiles	
Available (Calculated) Inventory Data         • Volume (TOV, GOV, GSV, NSV)         • Mass (Liquid, vapor, total)           • Reference density         • Volume correction factor (VCF, CTL)         • Volume derived flow           Clock & Time Synchronization         External using Entis Pro, ENTIS or Modbus host systems such as DCS           Supported Engineering Units         Evel         m.m.m.f.in. in/L6 and ft-in-16 (fis)           Temperature         °C, °F           Density         kg/cm <sup>2</sup> , KPa, pa(g), Pa           Volume         m <sup>2</sup> , USgal, bbl, I(L)           Mass/Weight         kg, bmreit con, long ton, US ton           Flow         m <sup>3</sup> /min, m <sup>3</sup> /n, I/min, bbl//min, bbl//n, USgal/min, USgal//min, USgal		Product pressure	Floating roof levels	
<ul> <li>Reference density</li> <li>Volume correction factor (VCF, CTL)</li> <li>S8W, Vapor (4 types), DCF, TCF, manual CTL</li> <li>Volume derived flow</li> </ul> Clock & Time Synchronization     External using Entis Pro, ENTIS or Modbus host systems such as DCS           Supported Engineering Units         Level         m, mm, ft, in, in/16 and ft-in-16 (fis)           Temperature         PC, PF                   Density                 kg/rm <sup>2</sup> , VAp, psi(g), Pa                   Volume                 m <sup>2</sup> , USgal, bbl, I(L)                   Mass/Weight                 kg/rm <sup>2</sup> , VAp, psi(g), Pa                   Volume                 m <sup>3</sup> , USgal, bbl, I(L)                   Mass/Weight                 kg/rm <sup>2</sup> , Wap, not, US son                   Flow                 m <sup>3</sup> /rmin, m <sup>3</sup> /rh, UKgal/h                   Volume                 m <sup>3</sup> /rmin, m <sup>3</sup> /rh, UKgal/h                   Available Tank Correction Methods                 - CTSh <sup>3</sup> - Floating Roof Weight                 - Temperature GRH                       - Temperature GRH                     - Servo Wire correction                     - Servo Wire correction                       - Servo Wire correction                     - Servo Wire correction	Available (Calculated) Inventory Data	• Volume (TOV, GOV, GSV, NSV)	Mass (Liquid, vapor, total)	
• S8W. Vapor (4 types). DCF. TCF. manual CTL               • Volume derived flow                 Clock & Time Synchronization               External using Entis Pro. ENTIS or Modbus host-strems such as DCS                 Supported Engineering Units               Level             m.m.m.ft. in, in/16 and ft-in-16 (fis)                 Temperature               w.m.m.ft. in, in/16 and ft-in-16 (fis)                 Pressure               kg/m <sup>2</sup> , °API, lb/ft <sup>3</sup> , RD60, lb/USgal                 Pressure               kg/m <sup>2</sup> , °API, lb/ft <sup>3</sup> , RD60, lb/USgal                 Volume               m <sup>3</sup> , USgal, bbl. (lt.)                 Mass/Weight               kg. lb, metric ton, long ton. US ton                 Row               Floating Roof Weight                 remperature GRH             · Pressure GRH             · Seriol Wrice correction             · Eloating Roof Immersion Compensation (RIC)                 Temperature profiles - Periodic scanning of temperature profiles data collector up to based on configuration.                 Density profiles               Varcobus serial (+ 4 additional ports by using o-Upr Up tout teseed on user command.             gauges and		Reference density	Volume correction factor (VCF, CTL)	
Clock & Time Synchronization         External using Entis Pro, ENTIS or Modbus host systems such as DCS           Supported Engineering Units         Level         m.mm. ft. in, in/16 and ft-in-16 (fis)           Temperature         °C, °F           Density         kg/m³, °API, lb/f³, RD60, lb/USgal           Pressure         kg/m³, °API, lb/f³, RD60, lb/USgal           Valume         m³, USgal, bbl. (L)           Mass/Weight         kg. lb. metric ton, long ton, US ton           Flow         m³/min, m³/h, Umin, bb//n, USgal/min, USg		• S&W, Vapor (4 types), DCF, TCF, manual CTL	Volume derived flow	
Supported Engineering Units         Level         m.mm. ft. in, in/16 and ft-in-16 (fis)           Temperature         °C, °F           Density         kg/m³, °API. lb/ft², RD60, lb/USgal           Pressure         kg/fcm², kPa, ps(g), Pa           Volume         m², USgal, bbl. (L)           Mass/Weight         kg, lb, metric ton, long ton, US ton           Flow         W³min, m²h, lmin, bb/min, bb/h, USgal/min, USgal/h, UKgal/h           Available Tank Correction Methods         • CTSh³           • Floating Roof Weight         • Temperature GRH           • Pressure GRH         • Servo Wire correction           • Servo Wire correction         • Floating Roof Immersion Compensation (RiC)           Temperature of RH         • Servo Wire correction           • Pressure GRH         • Servo Wire correction           • Servo Wire correction in Modbus output (RTU and TCP/IP) and OPC UA TCP output based on user command.           HOST CONNECTIVITY         • Serial modbus (Slave)           Serial Ports         2x modbus serial (+ 4 additional ports by using optional slots)           Supported Host Protocols         • Serial modbus (Glave)           • CU 886 emulation         • CI 1840 research (FTEA, FTEB and Office LAN)           Flebd Ports         Secotion slots (of which 4 ports can be used for serial host connectivity)           Wireless C	Clock & Time Synchronization	External using Entis Pro, ENTIS or Modbus hos	t systems such as DCS	
Image: Pressure of the series of th	Supported Engineering Units	ng Units Level m, mm, ft, in, in/16 and ft-in-16 (fis)	m, mm, ft, in, in/16 and ft-in-16 (fis)	
Densitypersourekg/m³, °API, lb/ft³, RD60, lb/USgalPressurekg/cm², kPa, psi(g), PaVolumem³, USgal, bbl, l(L)Mass/Weightkg, lb, metric ton, long ton, US tonFlowm²/min, m²/n, l/min, bb//min, bb//mi		Temperature	°C, °F	
Pressure         kg/cm², kPa, ps(g), Pa           Volume         m³. USgal, bbl. (L)           Mass/Weight         kg. lb. metric ton, long ton, US ton           Flow         m³/min, m³/n, m³/n, thin, bbl/hin, bbl/h. USgal/min, USgal/h, UKgal/h           Available Tank Correction Methods         • CTSh³ • Floating Roof Weight • Temperature GRH • Pressure GRH • Servo Wire correction • Floating Roof Immersion Compensation (RIC)           Temperature and Density Profiles         • Temperature for Immersion Compensation (RIC)           Temperature profiles of Immersion Compensation in Modbus output (RTU and TCP/IP) and OPC UA TCP output based on configuration. • Density profiles - Density profiles data collection to 50 density points from Honeywell Servo gauges and presentation in Modbus output and OPC UA TCP output based on user command.           Serial Ports         2x modbus serial (+ 4 additional ports by using optional slots)           Supported Host Protocols         • Serial modbus (Slave) • CIU 880 prime/Plus emulation • CIU 880 prime/Plus emulation (serial modbus)           Etetnet/LAN         3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)           Fleid Ports         6x option slots (of which 4 ports can be used for serial host connectivity)           Wireless Connectivity         ISA 100 via Honeywell WDM           Available Option Boards         Enraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus		Density	kg/m³, °API, lb/ft³, RD60, lb/USgal	
Volume         m³, USgal, bbl, I(L)           Mass/Weight         kg, lb, metric ton, long ton. US ton           Flow         m³/min, m³/h, Vmin, bbl/min, bbl/h, USgal/min, USgal/h, UKgal/h           Available Tank Correction Methods <ul> <li>CTSh³</li> <li>Floating Roof Weight</li> <li>Temperature GRH</li> <li>Pressure GRH</li> <li>Servo Wire correction</li> <li>Floating Roof Immersion Compensation (RIC)</li> </ul> <ul> <li>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) and OPC UA TCP output based on configuration.</li> <li>Density profiles Density profiles data collection up to 50 density points from Honeywell Servo gauges and presentation in Modbus output and OPC UA TCP output based on user command.</li> </ul> Most CONNECTIVITY <ul> <li>Serial modbus (Slave)</li> <li>CIU 880 Prime/Plus emulation (serial modbus)</li> </ul> Supported Host Protocols <ul> <li>Serial modbus (Slave)</li> <li>CIU 880 Prime/Plus emulation (serial modbus)</li> </ul> Ethernet/LAN <ul> <li>Supported Host Protocols</li> <li>Serial modbus (Glave)</li> <li>CIU 880 Prime/Plus emulation (serial modbus)</li> </ul> Flebed Ports                  Sa Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)		Pressure	kgf/cm², kPa, psi(g), Pa	
Mass/Weightkg. lb. metric ton, long ton, US tonFlowm³/min, m³/h, l/min, bbl/h, USgal/min, USgal/h, UKgal/hAvailable Tank Correction Methods• CTSh³ • Floating Roof Weight • Temperature GRH • Pressure GRH • Pressure GRH • Pressure GRH • Pressure GRH • Floating Roof Immersion Compensation (RIC)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) and OPC UA TCP output and TRL/2 gauges and presentation in Modbus output and OPC UA TCP output based on configuration. • Density profiles - Density profiles data collection up to 50 density points from Honeywell Servo gauges and presentation in Modbus output and OPC UA TCP output based on user command.Berial Ports2x modbus serial (+ 4 additional ports by using output and OPC UA TCP output based on user command. • CIU 858 emulation • CIU 850 Prime/Plus emulation (serial modbus)Ethernet/LAN3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)FleLOCONNECTIVITYFleld PortsField Ports6x option slots (of which 4 ports can be used for serial host connectivity)Wireless ConnectivityISA 100 via Honeywell WDMAvailable Option BoardsEnraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus		Volume	m³, USgal, bbl, l(L)	
Flowm³/min, m³/h, I/min, bbl/h, USgal/min, USgal/h, UKgal/hAvailable Tank Correction Methods<		Mass/Weight	kg, lb, metric ton, long ton, US ton	
Available Tank Correction Methods• CTSh <sup>3</sup> Floating Roof Weight Floating Roof Weight Pressure GRH Pressure GRH Pressure GRH Servo Wire correction Floating Roof Immersion Compensation (RIC)Temperature and Density ProfilesTemperature 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) and OPC UA TCP output based on configuration. Density profiles - Density profiles data collection up to 50 density points from Honeywell Servo gauges and presentation in Modbus output and OPC UA TCP output based on user command. <b>HOST CONNECTIVITY</b> Serial modbus (Slave) CIU 858 emulation CIU 858 emulation CIU 858 emulation CIU 858 emulation (serial modbus)Ethernet/LAN3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)FIELD CONNECTIVITYField PortsGx option slots (of which 4 ports can be used for serial host connectivity)Field PortsISA 100 via Honeywell WDMAvailable Option BoardsEnraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus		Flow	m³/min, m³/h, l/min, bbl/min, bbl/h, USgal/min, USgal/h, UKgal/h	
Temperature and Density ProfilesTemperature 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) and OPC UA TCP output based on configuration. Density profiles - Density profiles data collection up to 50 density points from Honeywell Servo gauges and presentation in Modbus output and OPC UA TCP output based on user command.HOST CONNECTIVITY2x modbus serial (+ 4 additional ports by using optional slots)Serial Ports2x modbus serial (+ 4 additional ports by using optional slots)Supported Host ProtocolsSerial modbus (Slave) - CIU 858 emulation - CIU 858 emulation - CIU 800 Prime/Plus emulation (serial modbus)Ethernet/LAN3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)Field Ports6x option slots (of which 4 ports can be used for serial host connectivity)Wireless ConnectivityISA 100 via Honeywell WDMAvailable Option BoardsErraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	Available Tank Correction Methods	<ul> <li>CTSh<sup>3</sup></li> <li>Floating Roof Weight</li> <li>Temperature GRH</li> <li>Pressure GRH</li> <li>Servo Wire correction</li> <li>Floating Roof Immersion Compensation (RIC)</li> </ul>	;)	
HOST CONNECTIVITYSerial Ports2x modbus serial (+ 4 additional ports by using optional slots)Supported Host Protocols- Serial modbus (Slave) - CIU 858 emulation - CIU 880 Prime/Plus emulation (serial modbus)Ethernet/LAN3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)FIELD CONNECTIVITYField Ports6x option slots (of which 4 ports can be used for serial host connectivity)Wireless ConnectivityISA 100 via Honeywell WDMAvailable Option BoardsEnraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	Temperature and Density Profiles	<ul> <li>Temperature profiles - Periodic scanning of ter and TRL/2 gauges and presentation in Modbu based on configuration.</li> <li>Density profiles - Density profiles data collection gauges and presentation in Modbus output ar</li> </ul>	mperature profiles data up to 16 points from BPM us output (RTU and TCP/IP) and OPC UA TCP output on up to 50 density points from Honeywell Servo ad OPC UA TCP output based on user command.	
Serial Ports2x modbus serial (+ 4 additional ports by using optional slots)Supported Host Protocols• Serial modbus (Slave) • CIU 858 emulation • CIU 880 Prime/Plus emulation (serial modbus)Ethernet/LAN3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)Field PortsField Ports6x option slots (of which 4 ports can be used for serial host connectivity)Wireless ConnectivityISA 100 via Honeywell WDMAvailable Option BoardsEnraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	HOST CONNECTIVITY			
Supported Host Protocols• Serial modbus (Slave) • CIU 858 emulation • CIU 858 emulation (serial modbus)Ethernet/LAN3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)FIELD CONNECTIVITYField Ports6x option slots (of which 4 ports can be used for serial host connectivity)Wireless ConnectivityISA 100 via Honeywell WDMAvailable Option BoardsEnraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	Serial Ports	2x modbus serial (+ 4 additional ports by using	optional slots)	
Ethernet/LAN       3x Modbus TCP/IP and / or OPC UA TCP ethernet (FTEA, FTEB and Office LAN)         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         Available Option Boards       Enraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	Supported Host Protocols	<ul> <li>Serial modbus (Slave)</li> <li>CIU 858 emulation</li> <li>CIU 880 Prime/Plus emulation (serial modbus)</li> </ul>	us)	
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         Available Option Boards       Enraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	Ethernet/LAN	3x Modbus TCP/IP and / or OPC UA TCP ether	net (FTEA, FTEB and Office LAN)	
Field Ports6x option slots (of which 4 ports can be used for serial host connectivity)Wireless ConnectivityISA 100 via Honeywell WDMAvailable Option BoardsEnraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	FIELD CONNECTIVITY			
Wireless Connectivity     ISA 100 via Honeywell WDM       Available Option Boards     Enraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	Field Ports	6x option slots (of which 4 ports can be used for	or serial host connectivity)	
Available Option Boards Enraf BPM fieldbus, Serial modbus (master) and Serial GPU input and TRL/2 Fieldbus	Wireless Connectivity	ISA 100 via Honeywell WDM		
	Available Option Boards	Enraf BPM fieldbus, Serial modbus (master) an	d Serial GPU input and TRL/2 Fieldbus	

Notes:

<sup>2</sup>Depending on gauge functionality.

<sup>3</sup>Ambient temperature input required.

(cont. next page)

<b>COMPLIANCE &amp; CERTIFICATIONS</b>	(CONT.)
Electrical Safety	<ul> <li>IEC 61010-1:2010 (3rd edition)</li> <li>EN 61010-1:2010</li> </ul>
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**

ENRAF BPM FIELD BUS CARD (POS	8 TO 13 = B)
Physical Layer	2-wire Bi-phase mark modulated (MIL-STD-1553)
Supported Protocol(s)	Enraf BPM
Typical No. Field Devices	10-15, depending on cable spec and length
Baud Rate	1200/2400/4800 Baud
Distance	10 km or more depending on cable characteristics
Cable Characteristics	1 uF/200 Ohm max.
Type of Galvanic Isolation	Transformer coupled with ground shield
Galvanic Isolation	1500 V
TRL/2 FIELD BUS CARD	
Physical layer	Emerson TRL/2 Protocol
Supported Protocol(s)	Modbus RTU
Typical No. Field Devices	8
Baud Rate	4800 Baud
Distance	4 km
Cable Characteristics	18 AWG (minimum) with shielded twisted pair, max 4 kms with max 8 multi drop
Type of Galvanic Isolation	Gauge connections Transformer coupled with ground chield
AND MODBUS SLAVE (HOST))	ARD (GPO MASTER (INPOT), MODBOS MASTER (INPOT)
Physical layer	2-4 wire RS-485 or RS-232C
Protocol(s)	GPU Master (Field communication)
	Modbus Master (Field communication)
Paud Pata	Modbus Slave (Host communication)
Type of Galvanic Isolation	
Galvanic Isolation	1500 V
Number of Modbus Slave Devices	32 modbus field devices (RS 485) multi-dropped.
(for modbus master field communications)	<ul> <li>I modulus neta device (RS232)</li> <li>50 devices can be configured (If connected through a converter/concentrator)</li> </ul>

# **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 Cate	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 S	STEM			
0/S			Linux Arch	
Memory			4 GB Flash memory (upgradable)	
USER INTERFA		/0		
Front Panel Displa	y		Backlight LCD color display (50 x 38 mm; 320 x 240 pixels) for status and diagnostics	
User Input			6 switches (←, →, ↑, ↓, OK and Esc) with LED (ring of light) status indication	
Key Lock Switches	3		2x (for configuration, resp. W&M sealing)	
Serial Ports			2x non-isolated RS-232C	
Ethernet Ports			5x 10/100 Mb on back side	
Service Ethernet P	Port		1x behind front panel—DHCP enabled, auto sensing, 10/100 Mb	
ENVIRONMEN	TAL			
Ambient Temperat	operature         0 °C to + 60 °C (32 °F to 140 °F)			
Storage Temperat	ure	-20 °C to 85 °C (-4 °F to 185 °F)		
Enclosure Classifi	cation	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			<ul> <li>Enclosure: Acryl painted steel</li> <li>Heat sinks (left and right side): Black anodized aluminum</li> <li>Front panel: ABS/PPE</li> </ul>	
Dimensions (WxH	HxD)         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 Accessoiries)	
Max. Load on Top (	(Table Top U	Je Top Use)         10 kg (22.0 lb)		
AVAILABLE AC	CESSORI	S		
19" installation bra	cket		Part no. A0888904	
Wall mounting bra	cket		Part no. A0888903	
Set Ethernet Cable	ables Part no. A0888911			
Set Ethernet cable	S			
1 SYNC link	Orange	1 meter		
2 FTE	Yellow/ Green	3 meter	Part no. A0888911	
1 LAN	Blue	2 meter		
1 Remote Access	Red	3 meter		
1 Service Port	Grey	3 meter		

#### Identification Code - Hardware Configuration

#### Pos 1 Application

0 For Inventory Control of Bulk Storage Tanks ۲ Compliant with National Legal Metrology Requirements (specify country) Pos 2 Base Configuration Hardware S <u>CIU for Tank Inventory Management</u> Pos 3 Memory A 4 GB Flash Pos 4 Selection CIU 888 Hardware Configuration Pos 5, 6, 7 Product designation 8 8 Communication Interface Unit Pos 8 Field Card Slot 1 2 Not Used Ø Serial Modbus Input (Master) Ó TRL/2 Fieldbus B Enraf Fieldbus (BPM) Ġ Serial GPU (input) Pos 9 Field Card Slot 2 2 Not Used ۵ Serial Modbus Input (Master) Ô TRL/2 Fieldbus B Enraf Fieldbus (BPM) Ġ Serial GPU (Input) Pos 10 Field and Host Communication Slot 3 2 Not Used Serial Modbus Input (Master) TRL/2 Fieldbus Host Serial Modbus (Slave) B Enraf Fieldbus (BPM) Ġ Serial GPU (Input) Pos 11 Field and Host Communication Slot 4 Not Used M Serial Modbus Input (Master) Ô TRL/2 Fieldbus 0 Host Serial Modbus (Slave) B Enraf Fieldbus (BPM) Ġ Serial GPU (Input) Pos 12 Field and Host Communication Slot 5 Not Used Ø Serial Modbus Input (Master) Ó TRL/2 Fieldbus 0 Host Serial Modbus (Slave) Ô Host CIU Emulation B Enraf Fieldbus (BPM) Ġ Serial GPU (Input) Pos 13 Field and Host Communication Slot 6 2 Not Used ۵ Serial Modbus Input (Master) Ó TRL/2 Fieldbus 0 Host Serial Modbus (Slave) B Enraf Fieldbus (BPM) Ċ Host CIU Emulation Ġ Serial GPU (Input) Pos 14 Extended Memory Not Installed Ø Pos 15 Tag Plate 0 Not Required Ô Tag Plate Sticker Added Pos 16 Not Used Z Not Used 8 8 8 7 Typical Identification Code 8 8 Ø Ð 8 Ø Your Identification Code

# Identification Code CIU 888 – Software Functionality 888

Pos 1 Application

e 2 Raca	Configuration with	n Pos ZU, in case	e Positi duesnit need an upgrade)
	Configuration 3	Soltware	
Dodup	JIU System dapov Enabled Por	r   loit	
None (i	used in combinatio	on with Pos 20 ir	in case Pos 2 doesn't need an ungrade)
Pos 3	Functionality		
<b>S</b> A	ccording Standarc	Ł	
F	Pos 4 CIU Type		
	Tank Gauging	) Software Functi	cionality
	Pos 5, 6, 7	Product design	nation
	888	Communicat	tion Interface Unit
		Pos 8, 9 Inte	terfacing and Calculations
			icanning Functionality
			Scanning with integrated Volume Calculation module
			vone (used in combination with Pos 20, in case Pos 8,9 doesn't need an upgrade)
			7 Not enabled
			Chemicals Group 1 *2
			E Ethanol/Alcohol
			🕒 Hydrogenated Vegetable Oil
			Ammonia, Chemicals Group 1, Ethanol/Alcohol, Hydrogenated Vegetable Oil Inventory Calculations
			Pos 11 Host Communication OPCUA
			No OPCUA-server
			Standard OPCUA server *3)
			Pos 12 Host Communication Modbus ICP/IP
			V Not Enabled
			Standard Ethernet (Modbus slave)
			Pos 13 Host Communication Fault Tolerant Ethernet
			2 Not Enabled
			Pos 14 Floating Roof Immersion Compensation
			Vot Enabled
			Floating Roof Immersion Compensation Enabled
			Pos 16 Density Profile
			Density profile
			Pos. 17,18 Number of tanks
			<b>0 5</b> Tanks max.
			<b>1 1 1 1 1 1 1 1 1 1</b>
			Tanks max.
			Tanks max.
			Tanks max.
			Tanks max

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Notes:

<sup>&</sup>lt;sup>12</sup> Benzene, Cumene, Cyclohexane, Ethylbenzene, Styrene, Toluene, m-Xylene, o-Xylene, Aromatic Hydrocarbons (Temperature range – 148.9 – 204.4°C)

<sup>\*3</sup> Standard OPCUA server option (S option in pos 11) is mandatory for ENTIS R130.1 or later versions

#### Identification Code CIU 888 – Software Functionality 888





Rear view

**Overall Dimensions** 

All dimensions in mm (In.)

Wall mount bracket

#### For More Information

To learn more about Honeywell's Tank Gauging Solutions, visit <u>process.honeywell.com</u> or contact your Honeywell Account Manager.

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