
Installation guide 880 CIU Prime / CIU Plus

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Preface

This installation guide is intended for technicians involved with the mechanical and electrical installation of the Honeywell Enraf series 880 CIU Prime and 880 CIU Plus.

For commissioning and service of the 880 CIU Prime and 880 CIU Plus, refer to the Instruction manuals of the 880 CIU Prime / CIU Plus and the Ensite Pro configuration tool. Refer also to the list of related documents in Appendix B. This installation guide describes only the installation of the 880 CIU Prime and 880 CIU Plus.

Legal aspects

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- Execution of activities that are not prescribed;
- Neglect of the safety regulations for handling tools, use of electricity and microwave radiation.

EC declaration of conformity

This instrument is in conformity with the protection requirements of EC Council Directive 93/68/EEC. The CE conformity marking fulfills the provisions of

- 89/336/EEC regarding EMC
 - EN 50081-1/2 Generic Emission Standard
 - EN 50082-1/2 Generic Immunity Standard
- 73/23/EEC regarding Low Voltage Directive

Note:

All connections to the CIU Prime and the CIU Plus must be made with shielded cables, with exception of the mains and the status output signals of the CIU Plus.

Additional information

Please do not hesitate to contact Honeywell Enraf or its representative if you require additional information.

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1 Introduction

The CIU Prime acts as an interface between Honeywell Enraf field equipment (such as the 854 level gauge or the SmartRadar gauges) and a host system.

The CIU Plus is basically a calculation module. All tank quantities such as volume, standard volume, mass, density, flow rate, etc. are calculated by the CIU Plus. The input is taken from the CIU Prime.

The CIU Prime and Plus are both modular designs, based on the same processor board. The housings of both CIU types are identical. Loading of designated software essentially determines whether the hardware functions as a CIU Prime or as a CIU Plus.

1.1 CIU Prime

The CIU Prime can contain up to four Field Ports. As Field Port can be installed an Enraf field bus input board, to which a maximum of 15 gauges can be connected. One or more of the Field Ports can be changed to RS-232C/RS-485 input board for connection of the model 858 CIU (Communications Interface Unit).

The CIU Prime has two fixed RS-232C/RS-485 Host Ports supporting the standard MODBUS protocol. Alternatively, one of the Host Ports can be configured for emulation of standard CIU protocol (compatible with the 858 CIU).

After configuration, the CIU Prime automatically polls the connected gauges and stores the information in a database. A maximum of 50 tanks can be configured in the database. The Host Port of the CIU Prime can be connected to the CIU Plus or other host system.

1.2 CIU Plus

The CIU Prime has two fixed RS-232C/RS-485 Field Ports.

Both Field Ports can be used to connect one or more CIU Prime(s).

After configuration, the CIU Plus automatically requests tank data from the connected CIU Prime(s) and calculates volume, mass, density, flow rate, etc. All information is stored in a database. A maximum of 50 tanks can be configured in the database.

Four RS-232C/RS-485 output boards supporting the standard MODBUS protocol are available as Host Port connection to Entis Pro and/or other host systems.

1.3 System overview

Figure 1.1 gives an overview of a basic system configuration (F: Field port; H: Host port).

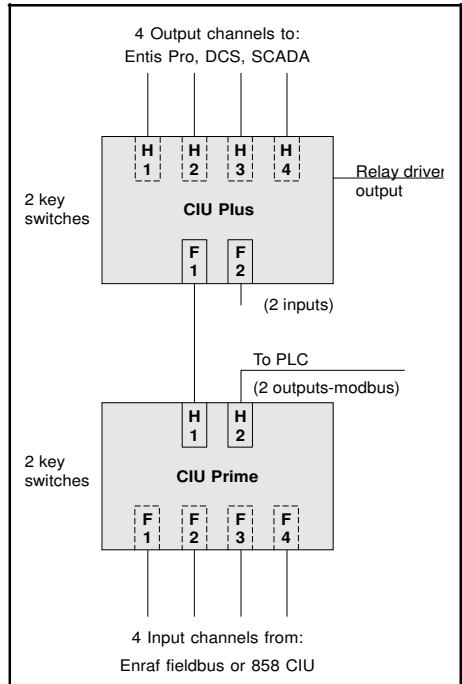


Figure 1.1 Basic system overview

2 Safety

2.1 Safety aspects of the CIU Prime and Plus

Warning

The CIU Prime is designed as an interface between Enraf tank gauging instruments with the Enraf field bus signal and an external host, communicating via RS-232C or RS-485 with MODBUS protocol.

Do not use the CIU Prime other for anything else than these applications, with exception of connection to or emulation of the 858 CIU.

The protection class for the CIU Prime and Plus housing is IP30 (NEMA 1), which implies that the instrument can be installed indoors in an explosion-safe area or in a protective cabinet. Other environmental parameters are:

- ambient temperature: 0 to 60 °C (32 to 140 °F)
- relative humidity: 5 to 90 % (non-condensing)
- over voltage category: II
- pollution degree: II

The CIU Prime Field Ports are galvanically separated. The host ports of the CIU Prime are not galvanically separated. In the CIU Plus, only the Host Ports are galvanically separated.

2.2 Personal safety

The technician must have basic technical skills to be able to safely install the equipment and work in accordance with the (local) requirements for electrical equipment.

Warning

Take all necessary personal protection measures and comply with the safety regulations which apply to the working area.

Never start working before the work permit has been signed by all parties.

Do not open the CIU Prime or Plus while power is still connected.

2.3 Safety conventions

“**Warnings**”, “**Cautions**” and “**Notes**” have been used throughout this installation guide to bring special matters to the immediate attention of the reader.

- A **Warning** concerns danger to the safety of the technician or user;
- A **Caution** draws the attention to an action which may damage the equipment;
- A **Note** points out a statement deserving more emphasis than the general text, but not requiring a “Warning” or a “Caution”.

2.4 Safety icons



This symbol on the label of the CIU warns the technician that life power is present when opening the CIU. Refer to the warning in section 2.2.

3 Storage and unpacking

3.1 Storage

During storage, the CIU Prime and Plus shall preferably be kept in its original packing and must be stored indoor. Storage temperature may vary between -20 and +80 °C (-4 and +176 °F).

When the CIU Prime and/or Plus are installed, but not powered for a prolonged period, it is advised to put some moisture-absorbing material such as silica gel in the CIU housing.

Warning

When opening the CIU housing, make sure the power is switched off.

Do not forget to remove the moisture-absorbing material when the CIU becomes operational again.

3.2 Unpacking and inspection

The CIU Prime / Plus is packed in a shipping carton for protection against damage. Should you nevertheless find any shipping or handling damage at delivery or during unpacking, immediately notify the carrier. If any equipment is missing or incorrect, notify the Honeywell Enraf distributor.

Check the identification code on the label to verify that the CIU Prime / Plus was delivered in accordance with your order.

4 Assembling the CIU Prime / Plus

The CIU Prime / Plus is delivered with two fixed I/O ports at slots 2 and 3 (refer to figure 4.1).

CIU Prime

- Up to four input boards (Field Ports) can be installed on the main board slots 5 to 8. These input boards can be:
 - Enraf field bus input board
 - RS-232C/RS-485 input board with 858 CIU communication
- Slot 9 is used when the optional key switches are installed (e.g. for W&M).

CIU Plus

- Up to four output boards (Host Ports) can be installed on the main board in slots 5 to 8. This is the RS-232C/RS-485 output board with MODBUS communication.
- Slot 9 is used when the optional key switches are installed (e.g. for W&M).

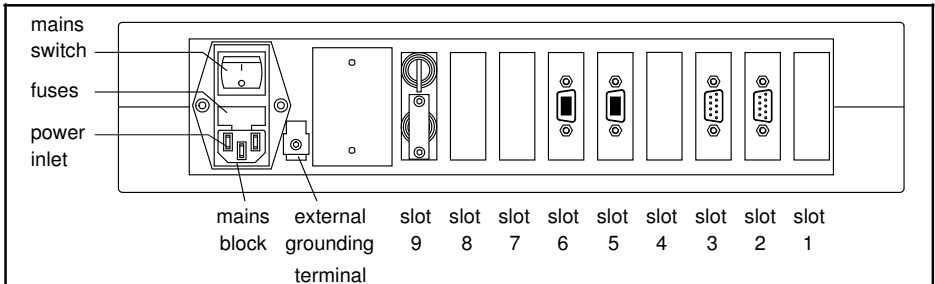


Figure 4.1 I/O slots of the CIU

Warning

Before opening the CIU cover, disconnect the mains from the power inlet.

To install the I/O boards, remove the top cover of the CIU by loosening the two screws at each side. For installation of the I/O board and key switches, refer to the instructions enclosed with these options.

After installing the Field / Host Ports and optionally the Key switch, place the top cover and fix the two screws at each side.

Stickers are provided to identify the Field and Host Ports of the CIU.

These stickers can be attached on the I/O port installation plate above the connector, or at any place which is readable after installation of the CIU.

Refer to figure 4.2 for the sticker position at the CIU Prime.

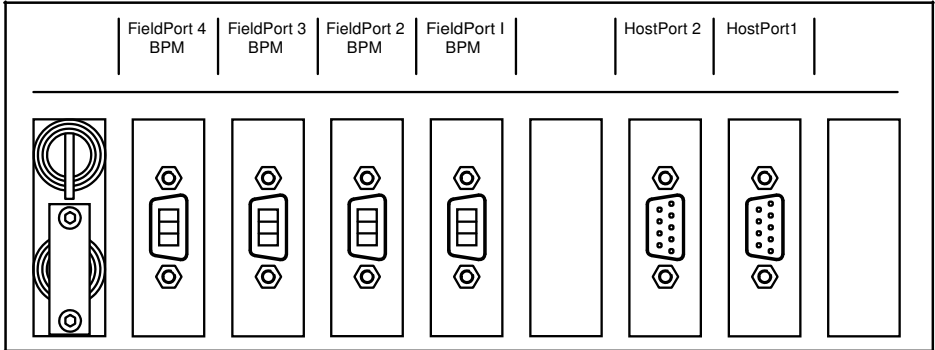


Figure 4.2 Stickers at CIU Prime

Refer to figure 4.3 for the sticker position at the CIU Plus.

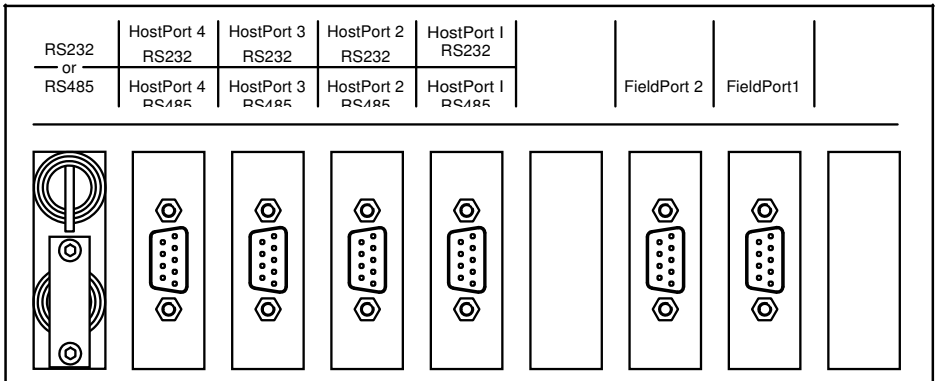


Figure 4.3 Stickers at CIU Plus

5 Mechanical Installation

The mechanical installation of the CIU Prime and Plus can be done in three ways:

- Table top (section 5.1)
- 19" rack mounting (section 5.2)
- Wall mounting (section 5.3)

5.1 Table top

This is the easiest way of installing the CIU. Just place the CIU on a table (or desk). Multiple CIU housings may be stacked.

Place the identification stickers on front of the CIU as indicated in figure 5.3.

5.2 19" Rack mounting

For the installation of the CIU in a 19" rack, first two brackets must be fixed to the left and right side of the CIU housing.

Refer to figure 5.1.

- 1) Remove the two screws indicated as 'A' in figure 5.1.
- 2) Place 19" rack bracket to the side of the CIU and fix it with the screws indicated 'A'.
- 3) Repeat the same procedure for the other side of the CIU.
- 4) Install the CIU in the 19" rack.
- 5) Place the identification stickers on front of the CIU as indicated in figure 5.3.

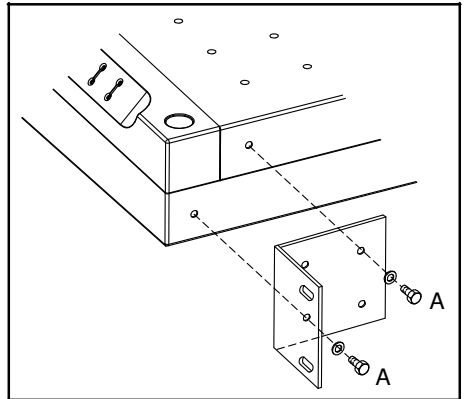


Figure 5.1 Brackets for 19" rack

5.3 Wall mounting

For installation of the CIU against the wall (or other vertical mounting), first two brackets must be fixed to the left and right side of the CIU housing.

Refer to figure 5.2.

- 1) Remove the two screws indicated as 'A' in figure 5.1.
- 2) Place 19" rack bracket to the side of the CIU and fix it with the screws indicated 'A'.
- 3) Repeat the same procedure for the other side of the CIU.
- 4) Install the CIU against the wall (or other vertical mounting).
- 5) Place the identification stickers on front of the CIU as indicated in figure 5.3.

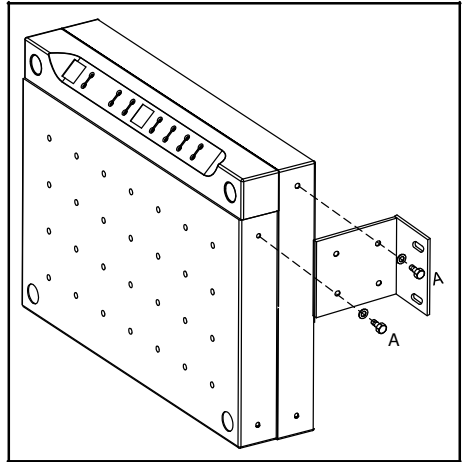


Figure 5.2 Wall mounting installation

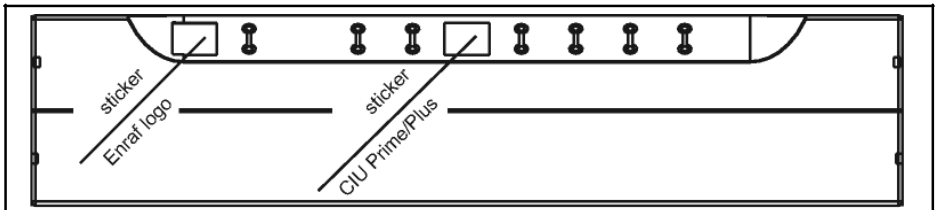


Figure 5.3 Stickers at front of CIU

6 Electrical installation

6.1 Grounding

The CIU is grounded via the earth wire of the mains cable.

External grounding may be required when the CIU is installed in a 19" rack, or otherwise in a cabinet. For this purpose an external ground terminal is provided, which is located at the rear side of the CIU, next to the mains block (refer to figure 4.1).

A 4 mm² single or stranded copper wire is generally accepted by the safety authorities.

Note:

Grounding shall be performed in accordance with local regulations.

6.2 Mains

Mains supply for the CIU is 100 - 240 Vac, 50/60 Hz. The power rating is 50 VA max. (25 VA typical). Supply variations of +10% and -15% are allowed.

The power supply unit inside the CIU detects to which supply it is connected and automatically switches over to the correct setting.

The mains block contains two fuses (size: Ø5 x 20 mm), both rated: 1.6 A slow (T1.6A L 250V) in accordance with IEC 60127-2/III.

Caution

Check whether the mains supply voltage falls within the specified limits of 100 - 240 Vac.

Plug the power cord Euro connector (female) into the power inlet of the CIU.

The other side of the power cord can be connected two ways:

- via the mains plug
- connection to terminals

Note:

Always use proper installation material.

*When the mains connection is made to terminals without the ground connection, the grounding **must** be made via the external ground terminal at the rear side of the CIU.*

The mains switch is located at the rear side of the CIU.

6.3 Field and Host Port connections CIU Prime

6.3.1 Enraf field bus

A maximum of 50 gauges can be connected to the CIU Prime. Divide the number of gauges equal over the Field Ports with a maximum of 15 gauges per Field Port. Best results are obtained when the Enraf field bus signal to the gauges is connected in a “star” configuration. Refer to figure 6.1.

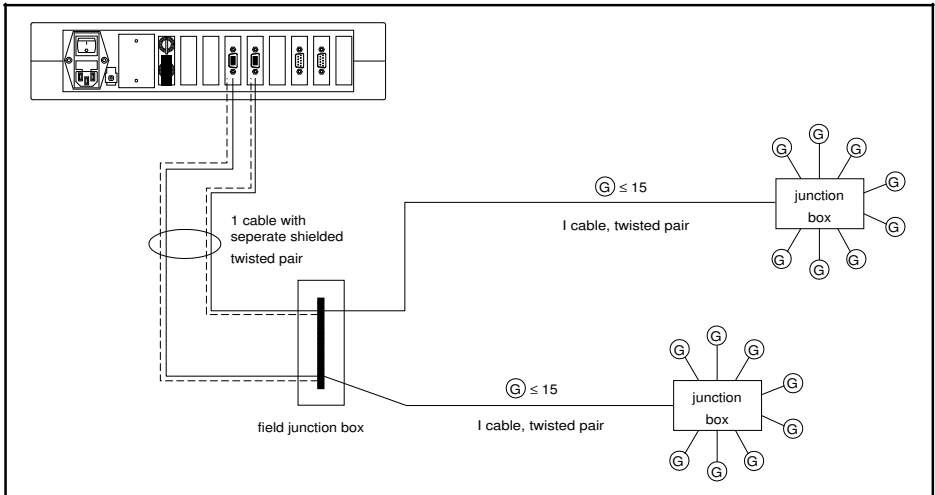


Figure 6.1 Wiring of Enraf field bus

Connect the Enraf Field bus cable to the two outer terminals of the connector at the Field Port (slots 5 to 8). The Enraf field bus signal is not polarity-sensitive. The shield of the Enraf field bus cable must be connected to the centre terminal. Refer to figure 6.2.

Cable requirements:

- One twisted and shielded pair
- $R_{\max.}$: 200 Ω (per line)
- $C_{\max.}$: 1 μF (to each other and to ground)

Note:

To prevent cross-talk, only **individually shielded twisted pairs** should be used in a multi-core cable.

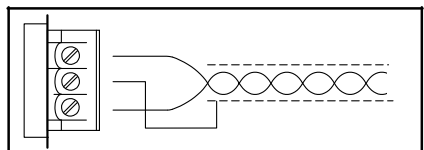


Figure 6.2 Enraf field bus connection

6.3.2 RS-232C input for 858 CIU

An RS-232C Field Port for connection to an 858 CIU (Communications Interface Unit) can be placed in any of the slots 5 to 8. Refer to figure 6.3 for RS-232C pin configuration and connections.

Cable requirements:

- Max. length: 15 m (50 ft)
- Overall shielded

Connections over short distances can be made with a so-called “null modem” cable. If the distance is longer than 15 m (50 ft), a modem connection must be used. The connection to the modem depends on the type of modem used.

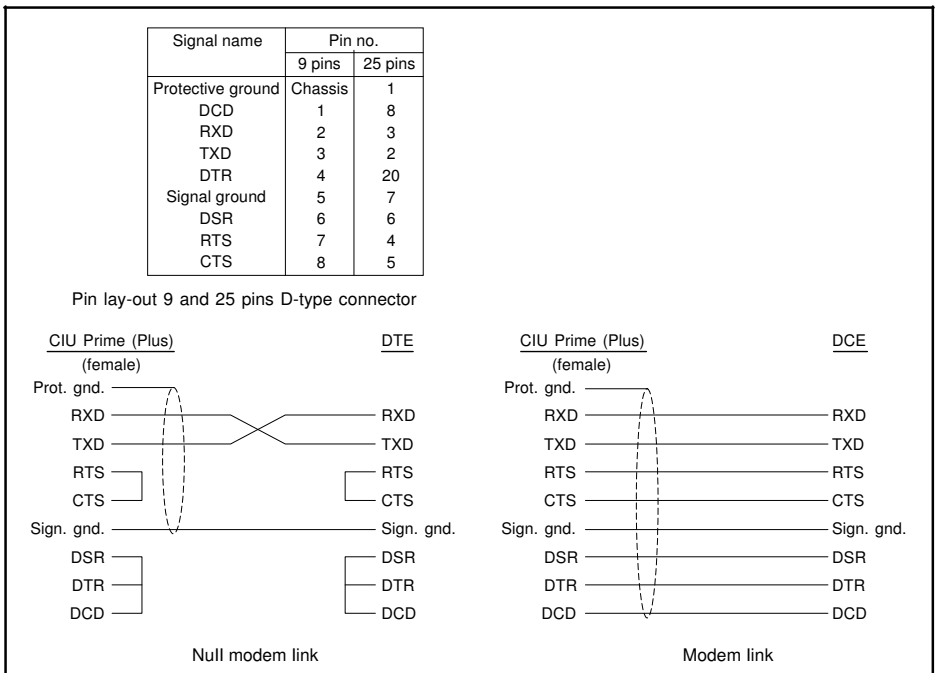


Figure 6.3 RS-232C connections

6.3.3 MODBUS output

The MODBUS Host Ports (slots 2 and 3) can be configured for either RS-232C or RS-485.

Refer to figure 6.3 for RS-232C pin configuration and connections and to figure 6.4 for RS-485 pin configuration and connections.

Cable requirements RS-232C connection:

- Max. length: 15 m (50 ft)
- Overall shielded

Connections over short distances can be made with a so-called “null modem” cable. If the distance is longer than 15 m (50 ft), a modem connection must be used. The connection to the modem depends on the type of modem used.

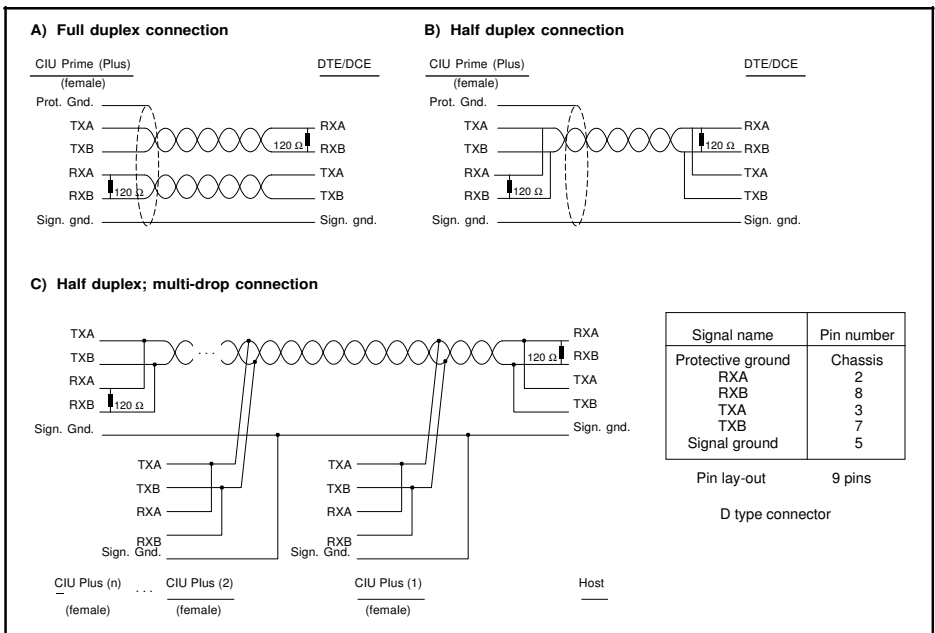


Figure 6.4 RS-485 connections

Cable requirements RS-485 connection:

- Max. length: 1000 m (3000 ft)
- Minimum one twisted pair (typical: 50 twists per metre) plus ground wire
- Overall shielded
- R_{\max} : 0.12 Ω /m (per line)
- C_{\max} : 119 pF/m
- L_{\max} : 1.45 mH/m

Caution

*The output ports (Host Ports) of the CIU Prime are **not** galvanically isolated.*

Use figure 6.4A for full duplex RS-485 connection or figure 6.4B when a half duplex RS-485 connection is required. For half duplex, connect signals RXA with TXA and RXB with TXB inside the cable connectors. Place 120 Ω resistors at the receive terminals in the cable connectors.

Direct connection can **only** be made if the CIU Prime and the DTE (CIU Plus, or host computer system) are grounded at the same point.

In all other cases, ensure there is *at least* a proper galvanic isolation at the DTE side. Galvanic isolation can also be obtained by means of a modem connection between the CIU Prime and the host computer system.

6.4 Field and Host Port connections CIU Plus

The MODBUS Field Ports (slots 2 and 3) and Host Ports, in slots 5 to 8, can be configured for either RS-232C or RS-485.

Refer to figure 6.3 for RS-232C pin configuration and connections and refer to figure 6.4 for RS-485 pin configuration and connections.

Cable requirements RS-232C connection:

- Max. length: 15 m (50 ft)
- Overall shielded

Connections over short distances can be made with a so-called “null modem” cable. If the distance is longer than 15 m (50 ft), a modem connection must be used. The connection to the modem depends on the type of modem used.

Cable requirements RS-485 connection:

- Max. length: 1000 m (3000 ft)
- Minimum one twisted pair (typical: 50 twists per metre) plus ground wire
- Overall shielded
- R_{\max} : 0.12 Ω /m (per line)
- C_{\max} : 119 pF/m
- L_{\max} : 1.45 mH

Caution

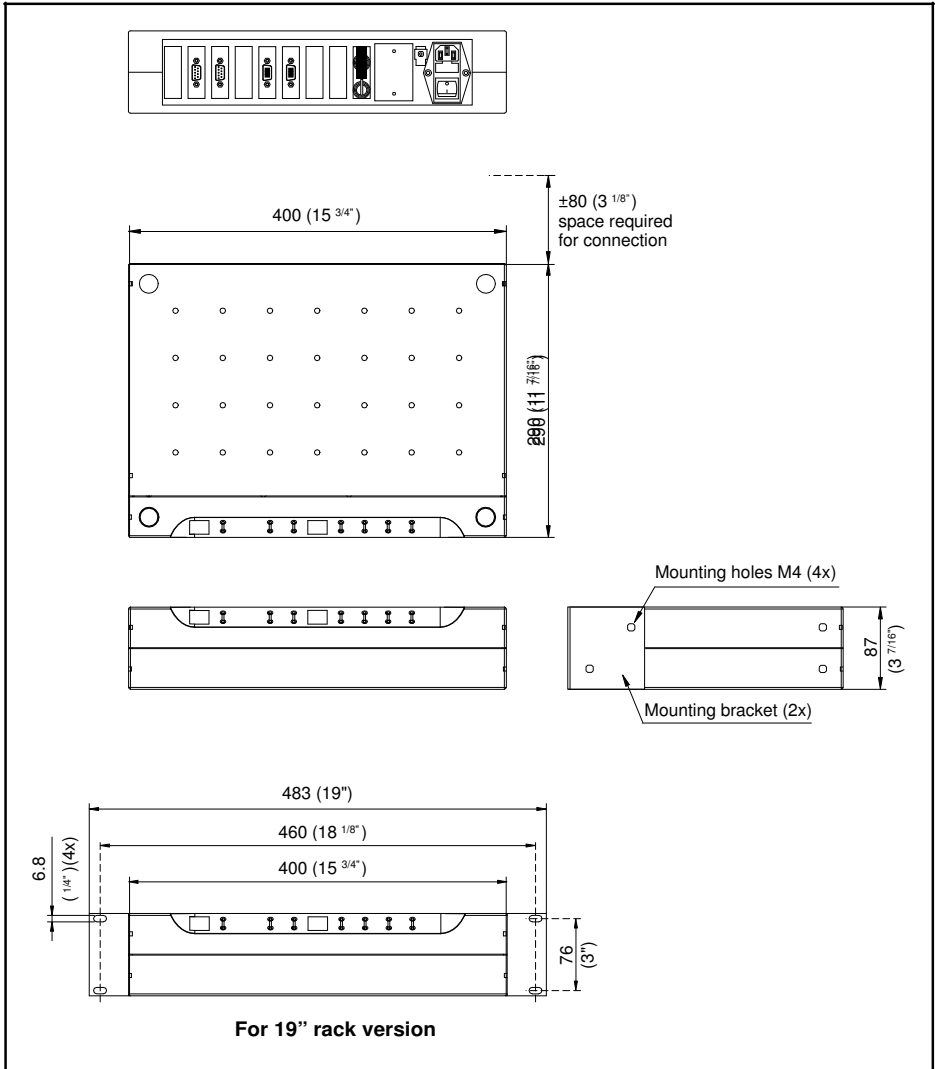
*The input ports (Field Ports) of the CIU Plus are **not** galvanically isolated.*

Use figure 6.4A for full duplex RS-485 connection or figure 6.4B when a half duplex RS-485 connection is required. For half duplex, connect signals RXA with TXA and RXB with TXB inside the cable connectors. Place 120 Ω resistors at the receive terminals in the cable connectors.

Direct connection can **only** be made if the CIU Plus and the CIU Prime are grounded at the same point. In all other cases, galvanic isolation *must* be obtained by means of a modem connection between the CIU Plus and the CIU Prime.

The output ports (Host Ports) of the CIU Plus have a galvanic separation. With RS-485 it is possible to connect more than one CIU Plus to one Host input. Refer to figure 6.4C for the connection.

Appendix A Dimensional drawings



Appendix B Related publications

Installation guide Key switches in 880 CIU Prime (Plus)
Installation guide RS-232C/RS-485 input/output board in 880 CIU Prime (Plus)
Installation guide Enraf field bus input board in 880 CIU Prime

Instruction manual series 880 CIU Prime
Instruction manual series 880 CIU Plus
Instruction manual CIU Prime type 880 (CIU858 emulation)

Instruction manual Modbus™ protocol

Instruction manual Ensite Pro configuration tool

Identification code series 880 CIU Prime (Plus)

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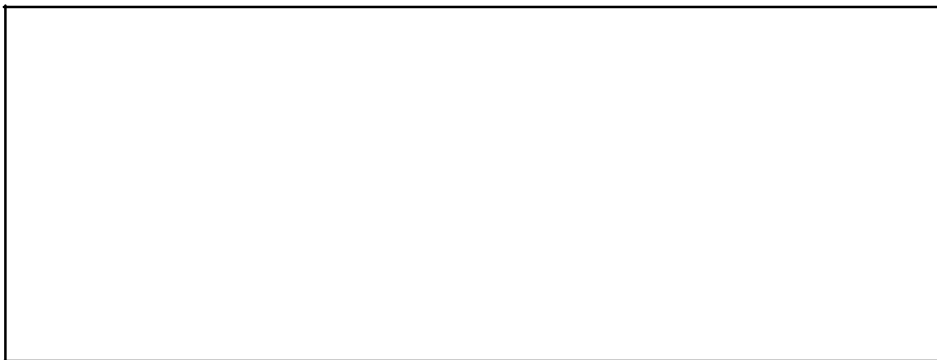
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