Connection Instructions

For External use

From DIgSILENT Pacific

Date 11 October 2023

Project No. 3887.00

Subject PFM OSM Connection Details

1 Introduction

This technical note is intended to provide connection guidance for integrating the PFM300-SSU15 into a generating system and/or sub-station.

Table 1.1 lists all the parts that need to be connected to ensure proper operation of the PFM300-SSU15 device. Proceeding figures (Figure 1.2 to Figure 2.4) show the various hardware components and how to connect them. The dimensions of the SSU15 are as shown in Figure 1.1 below.

Table 1.1: Connection items and points

Identification Number	Part
1	3 phase and Neutral Voltage Inputs from Voltage Transformer
2	3 phase and Neutral Current Inputs from Current Transformer
3	IRIG B or GPS Connection
4	LAN Connection – RJ 45
5	Alarms Outputs to SCADA
6	Power Connection

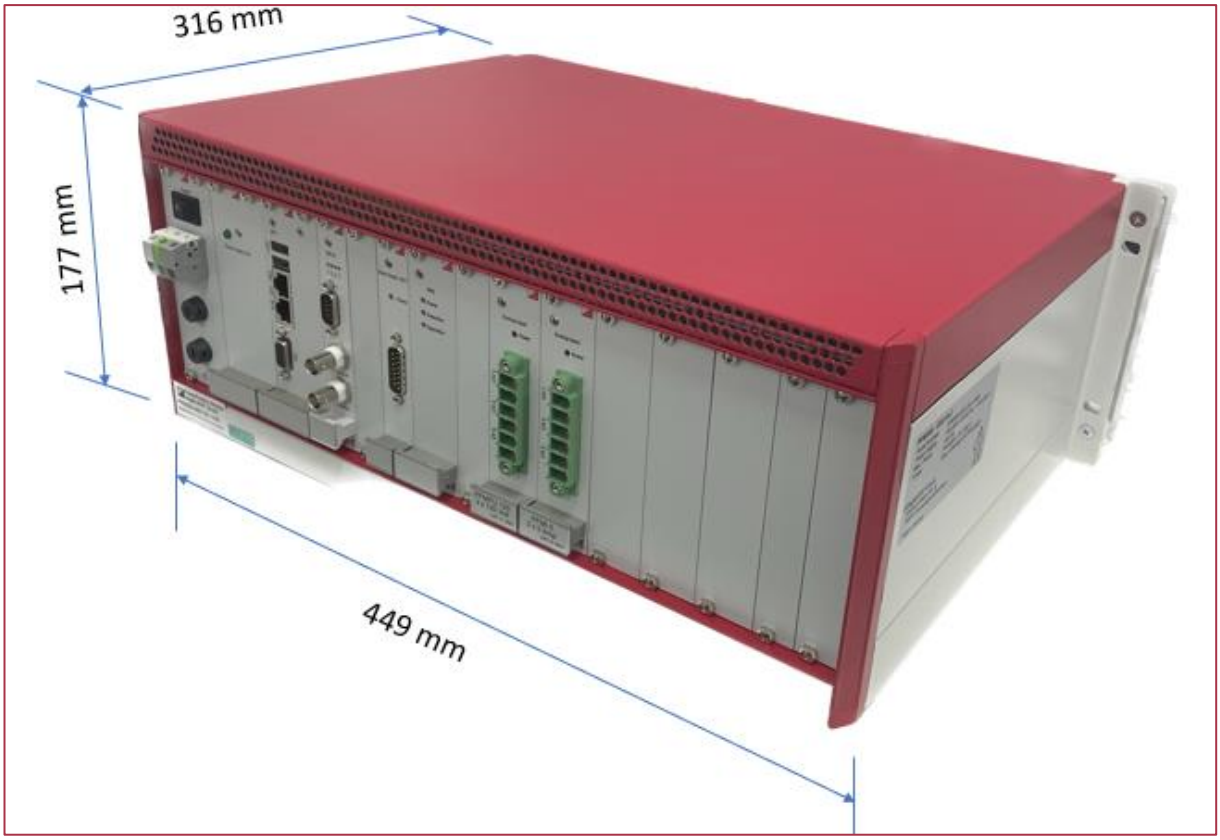

Figure 1.1: Smart Signal Unit - SSU15

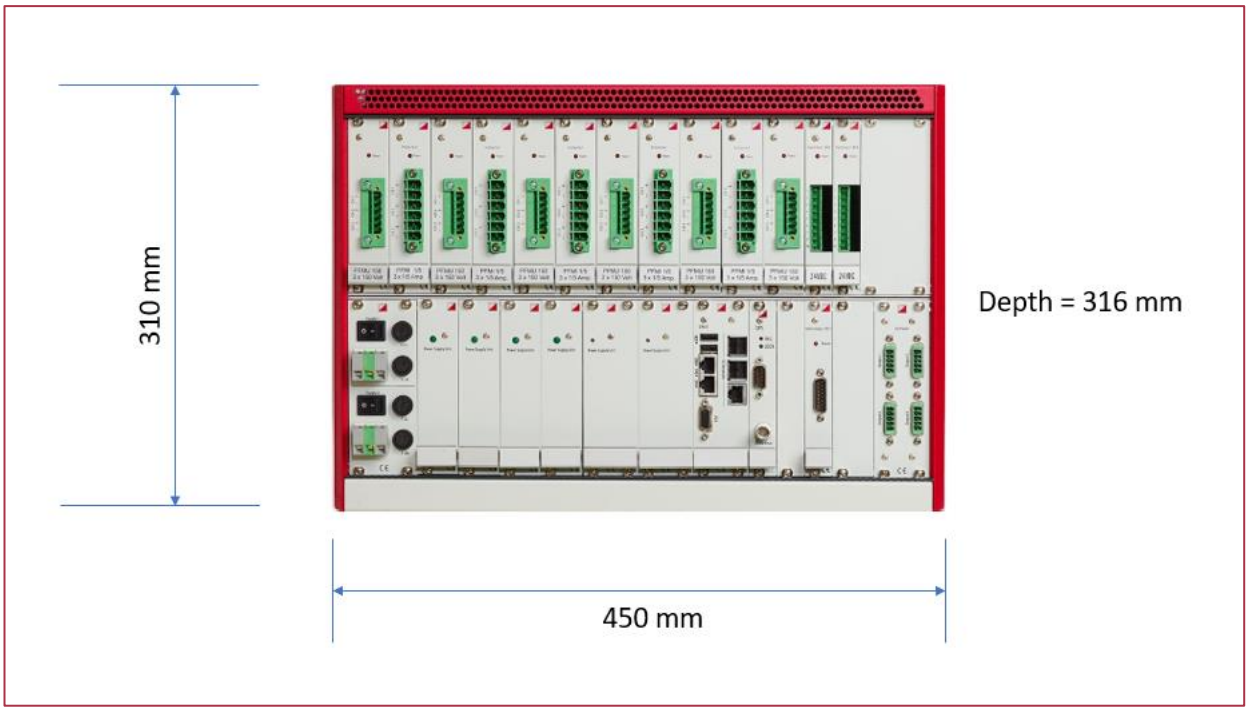

Figure 1.2. Smart Signal Unit - SSU32

The dimensions of the larger unit, the SSU32, are 310mm x 316mm x 450mm as illustrated in in Figure 1.2 above.

2 Connection details for each card

2.1 Voltage inputs – identification number (1)

The voltage transformer's (VT) secondary side is connected to the voltage card via a Phoenix contact, as depicted in Figure 2.1 below. The voltage card can be identified by the label “Volt” (e.g., 3 x 100 Volt) or by its ID (e.g., PFMFU 120), where 'U' denotes voltage.

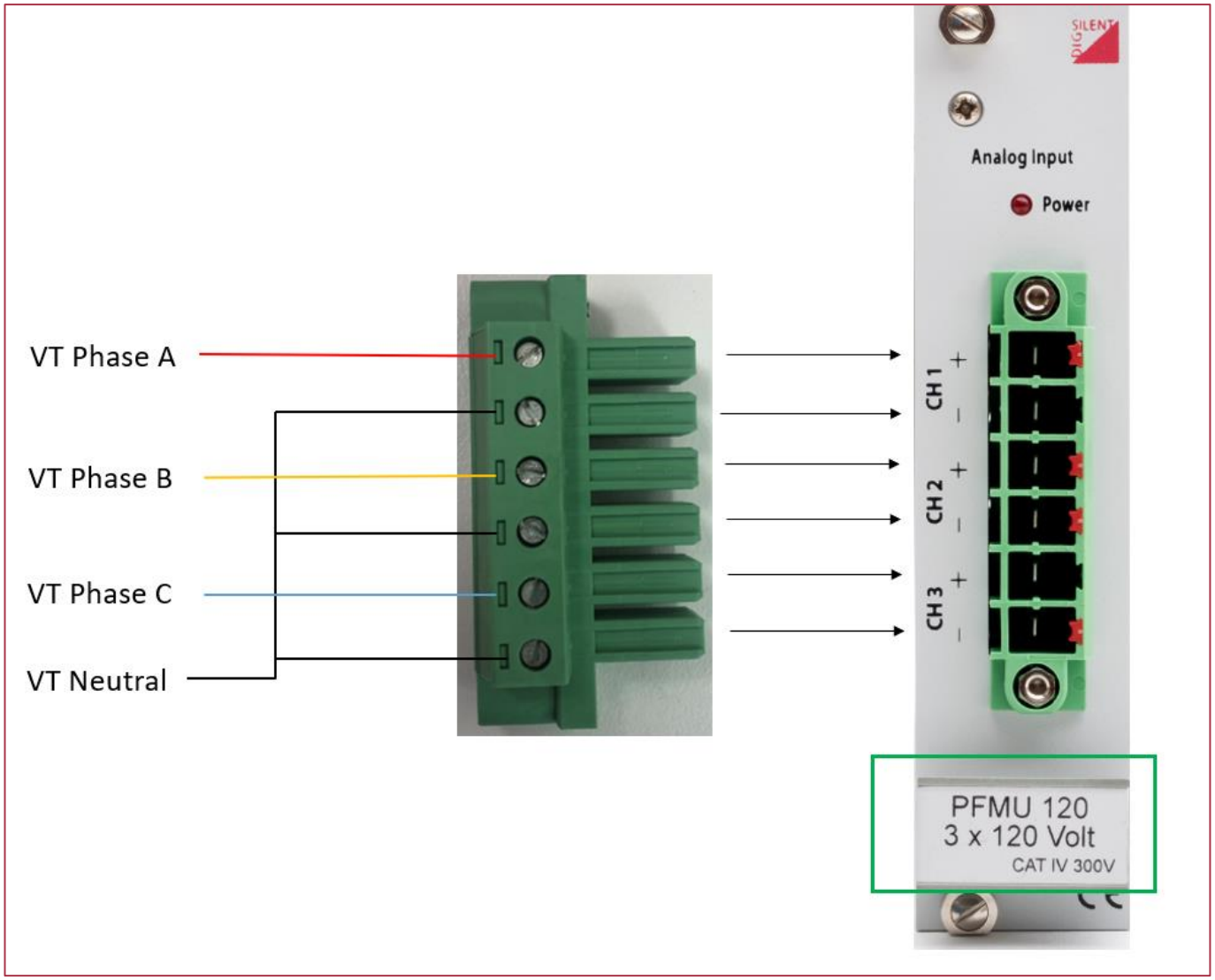

Figure 2.1. Connection diagram for voltage inputs (ID No: 1)

2.2 Current inputs – identification number (2)

The secondary side of the current transformer (CT) is connected to the current card via a Phoenix contact, as illustrated in Figure 2.2 below. The current card can be recognised by the label “Amp” (e.g., 3 x 5 Amp) or by its ID (e.g., PFMI) where 'I' denotes current.

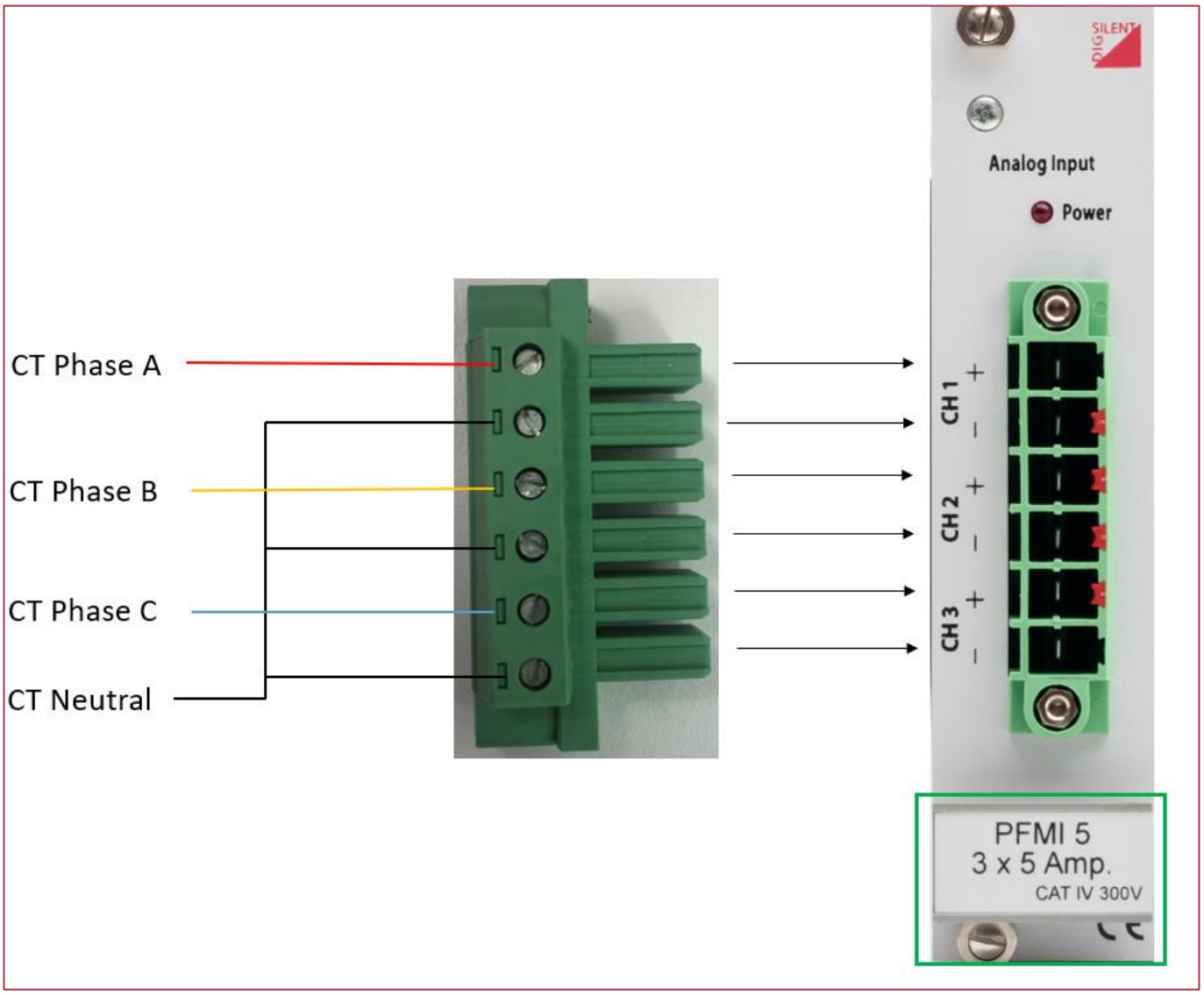

Figure 2.2. Connection diagram for current inputs (ID No. 2)

2.3 GPS or IRIG-B inputs – identification number (3)

The PFM300-SSU15 requires an external time source to acquire accurate time information. This time source can be either GPS or IRIG-B. The hardware features a female BNC connector to accommodate a male BNC connector using an R58 or R213 cable. The R213 cable type is preferred due to its lower losses per unit length. Figure 2.3 displays the connector and card.

Note: Do not connect IRIG-B source to a GPS card or a GPS antenna to an IRIG-B card. The choice of IRIG-B or GPS must be made before installation. If using GPS, a GPS antenna will be provided together with a splitter (i.e., one antenna feeds both PFMs).

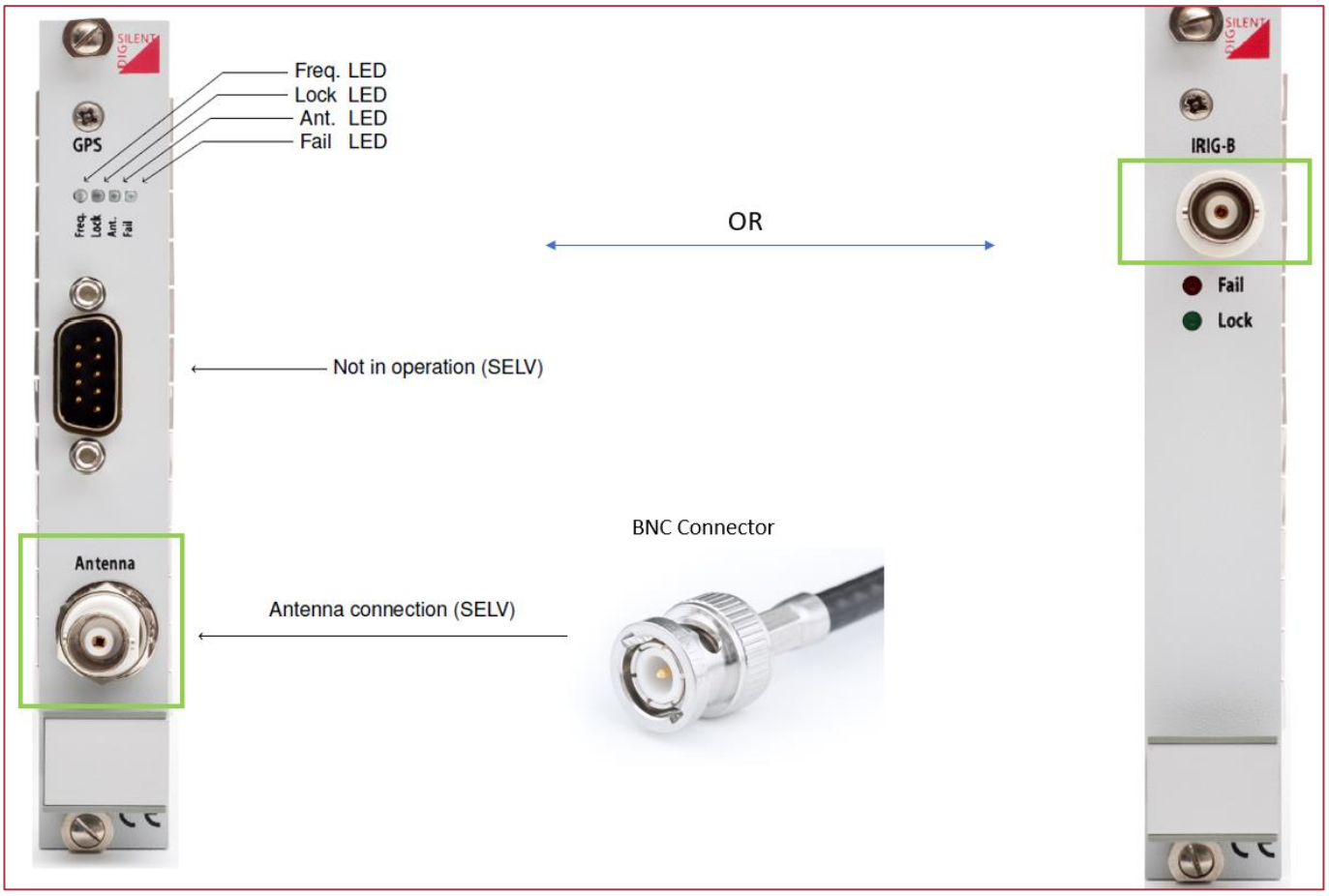

Figure 2.3. Connection points for GPS or IRIG-B (ID No. 3)

2.4 Network inputs – identification number (4)

The PFM300-SSU15 hardware is designed to be accessible on a network and thus requires a LAN connection through an RJ-45 cable. Figure 2.4 shows two ports for the RJ-45 connector present on the hardware and a corresponding male connector required to establish a connection. Note that there are 3 standard LAN ports on the PFM300-SSU15, and any could be used.

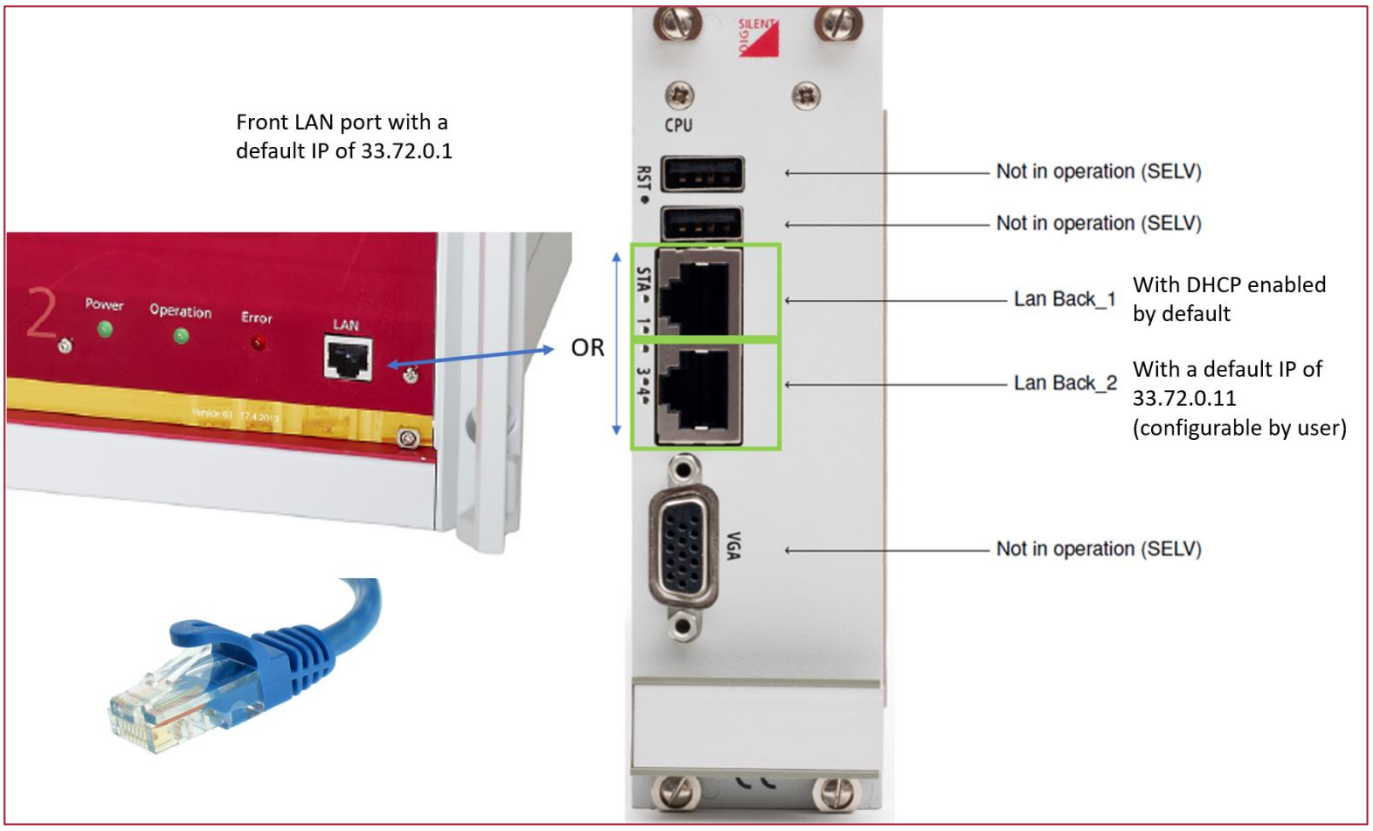

Figure 2.4. Connection point for RJ-45 (ID No. 4)

2.5 Alarm outputs – identification number (5)

The PFM300-SSU15 hardware has the capability to activate digital contacts upon specific triggers, as determined by its internal logic driven by measured external data. This output is facilitated through the Phoenix contact VS-15-DSUB-EG, which employs a D15 connector. The pinout of the Relay Output – D0-7 along with cable wiring is illustrated in Figure 2.5 below. This card serves as a digital output conduit featuring 7 dry contacts (6 of which are also normally open contacts).

Upon the occurrence of a trigger event, Switch 3 (S3) that links pin 2 and pin 3, closes, and can be utilised to signal an alarm in SCADA. Switch 2 (S2) is programmed to close based on the observed phase difference between reactive power (Q) and voltage (V) oscillations. Switch 4 (S4) activates upon encountering a runtime error such as a GPS antenna disconnection. Finally, Switch 1 (S1) is programmed to open as soon as the Monitoring device is powered off, serving as a means to monitor a disconnection. **The output contacts support voltages up to 30VDC.**

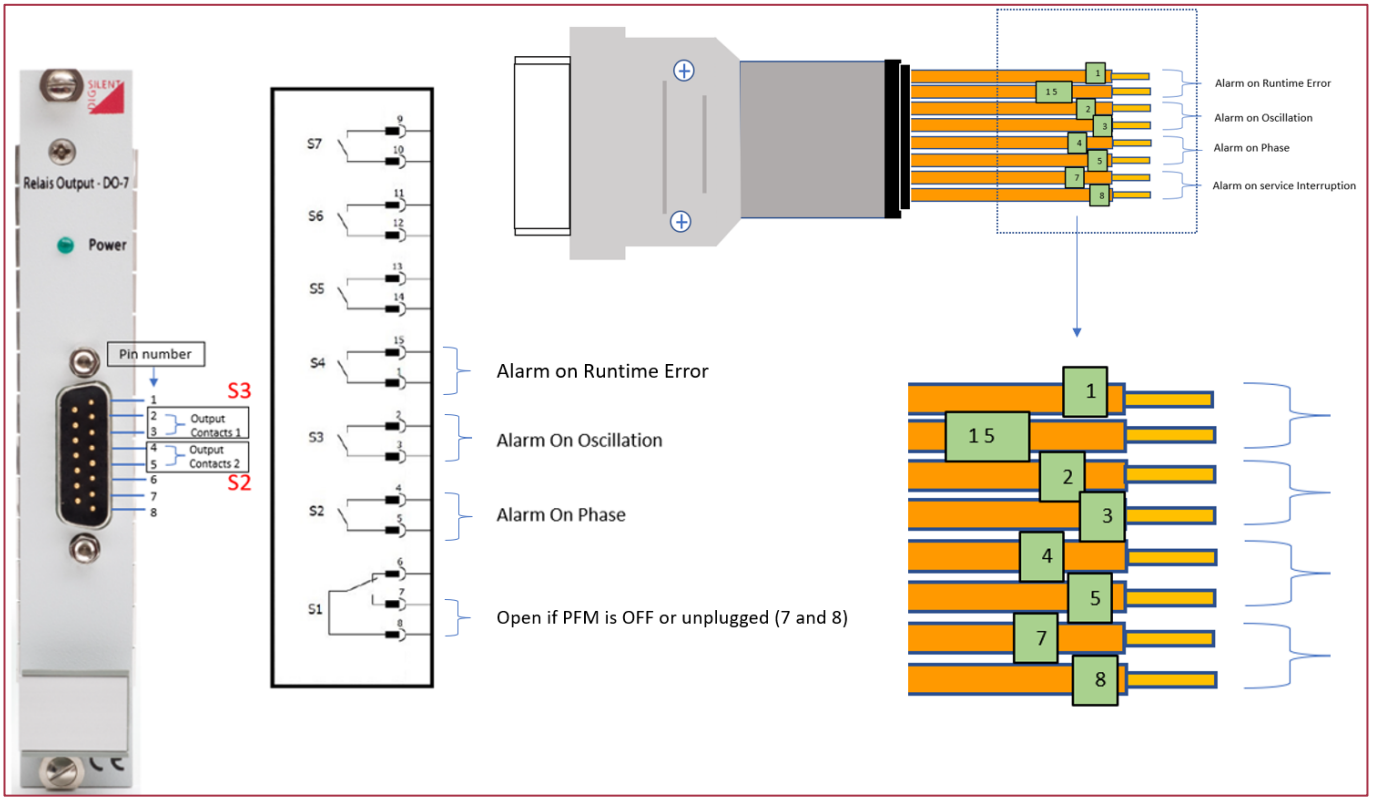

Figure 2.5. Digital output pin diagram for D15 connector (male) and cable with female connector

2.6 Power connection – identification number (6)

The PFM300-SSU15 hardware requires 110 to 240 Volts AC or DC for operation, and this should be connected through the terminal block shown in Figure 2.6 below.

Care should be taken to correctly connect the live, earth and neutral terminals to the correct source terminals to ensure proper operation. Do not interchange the live with neutral or earth.

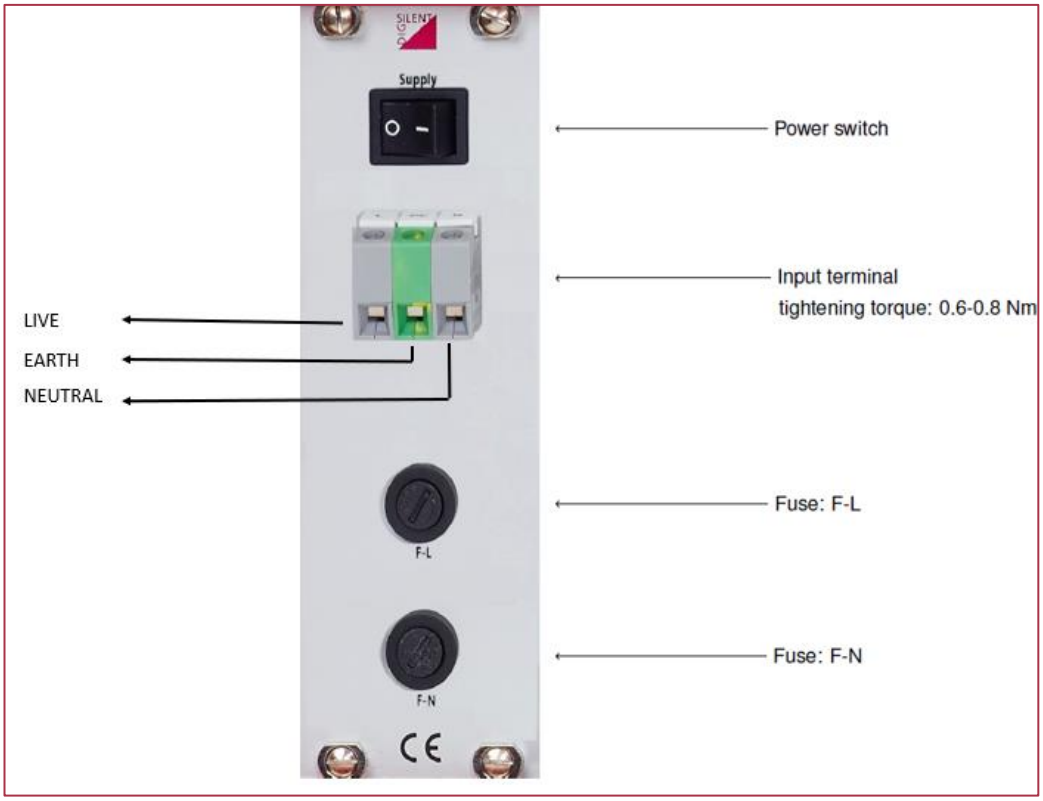

Figure 2.6. Power connection