

SERVICE REPORT

FJB-2

(Tangki D20-13A, D20-13B, D20-15A, D20-15B, R11, P-31, P-32)

Tidak bisa diresetting level

Properties tangki di WinOpi tidak bisa dibuka

**P-TSA Preventive Maintenance Peralatan ATG Area OM,
Lawe-lawe dan DHP RU V Balikpapan Selama (24 Bulan)**



SERVICE REPORT

Subject : Troubleshooting komunikasi jaringan FJB-2
Area : Utara
Date : 17 Mei 2021

A. CLAIM AND PROBLEM :

Claim :

1. Tidak bisa diresetting.

Problem :

1. Properties tidak bisa dibuka,
2. UnitID tangki tidak bisa ditarik.

B. FINDING :

1. Properties tidak bisa dibuka, tetapi tangki di WinOpi masuk.
2. Kabel transit di TJB pintu 4 dan pintu 3 tidak tersusun dengan Rapi, BOX JB terlalu kecil membuat kabel terlalu padat, diameter kabel 2,5mm sedangkan terminal yang digunakan untuk ukuran 1,5mm dan ujung copper di skun tusuk tidak crimping dengan baik.
3. Di TJB 2 sampai Loading Master menggunakan kabel fieldbus (tinned copper).



C. PROBLEM ANALYSIS, ACTION TAKEN AND RECOMMENDATION :

Problem Analysis :

Dilakukan penarikan unitID Direct secara bertahap Tangki D20-13A,
Ditarik dari TJB 1 utara : **Normal** (kabel twisted 1,5mm multipair copper)
Ditarik dari TJB pintu 4 : **Normal** (kabel twisted 2,5mm multipair copper)
Ditarik dari TJB pertengahan : **Normal** (kabel twisted 2,5mm multipair copper)
Ditarik dari TJB pintu 3 : **Normal** (kabel twisted 2,5mm multipair copper)
Ditarik dari TJB 2 : **Normal** (kabel twisted 2,5mm multipair copper)
Ditarik dari TJB 2 New (samping MA4) : **Error** (kabel twisted multipair fieldbus)
Ditarik dari Loading master : **Error** (kabel twisted multipair fieldbus)

Action Taken :

Mengganti kabel yang di TJB 2 ke loading master menggunakan kabel lama (twisted 1,5mm copper) dan hasilnya tangki bisa ditarik UnitIDnya.

Recommendation :

Mengganti kabel fieldbus dengan menggunakan kabel twisted multipair copper, karena kabel berbahan tinned copper memiliki resistansi lebih besar daripada copper. (Semakin besar diameter kabel, semakin kecil resistansi kabel)

Dibuat Oleh,
PT. Control Systems

Diketahui Oleh,
Pertamina RU V Balikpapan

MA4

El & Eng

3.4.9 Cabling for the TRL2/RS485 Bus

A standard Rosemount Tank Gauging system includes one or several Rosemount 2410 Tank Hubs communicating with a Rosemount 2460 System Hub using the TRL2/RS485 Modbus protocol as shown in [Communication](#).

TRL2 Bus

The TRL2 bus requires twisted and shielded pair wiring with a minimum cross-sectional area of 0.50 mm² (AWG 20 or similar). The maximum length of the TRL2 bus is approximately 4 km /13000 ft. The TRL2 field bus can normally use existing cables in the tank area.

Cable cross-sectional area for the TRL2 wiring should follow the recommendations in [Table 3-5](#).

Table 3-5: Minimum Cable Area for the TRL2 Bus

Maximum distance	Minimum cross-sectional area
3 km	0.50 mm ² (AWG 20)
4 km	0.75 mm ² (AWG 18)

Note

Wherever two or more TRL2 buses run alongside each other, sharing the same cable or conduit tube, use twisted and shielded wire and ensure that each pair of bus wires is individually shielded in order to avoid crosstalk.

Figure 3-13: Individually Shielded Pair Cables Minimizes Crosstalk



[Table 3-6](#) shows typical cable types that can be used for connecting the TRL2 bus. Other cables of similar type may also be used.

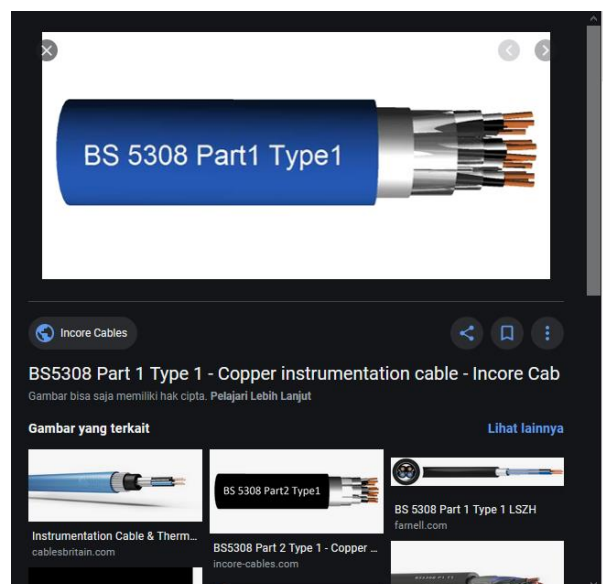
Table 3-6: Recommended Cable Standards for the TRL2 Bus

Type	Manufacturing standard	Core size
Signal	BS 5308 part 1, type 1	1 mm ²
Signal (armoured)	BS 5308 part 2, type 1	1 mm ²

RS485 Bus

The RS485 bus should meet the following requirements:

- twisted and shielded pair wiring
- characteristic impedance of 120 Ω
- maximum cable length 1200 m / 4000 ft.





Tankbus cabling

0.5-1.5 mm² (AWG 22-16), twisted shielded pairs. Recommended cabling is shielded twisted pairs, 0.75 mm² (AWG 18). Tankbus cabling must fulfill FISCO cable and installation requirements, and must also be approved for use at minimum 85 °C (185 °F).

FISCO (Fieldbus Intrinsically Safe Concept)

The following cable characteristics are specified for FISCO:

Table A-3: FISCO Cable Parameters

Parameter ⁽¹⁾	Value
Loop resistance	15 Ω/km to 150 Ω/km
Loop inductance	0.4 mH/km to 1 mH/km
Capacitance	45 nF/km to 200 nF/km
Maximum length of each spur ⁽²⁾ cable	60 m in apparatus class IIC and IIB
Maximum cable length including trunk ⁽³⁾ and spurs	1000 m in apparatus class IIC and 1900 m in apparatus class IIB

(1) For further information see requirements of the IEC 61158-2 standard

(2) A spur is an unterminated part of the network.

(3) A trunk is the longest cable path between two devices on the fieldbus network, and is the part of the network which has terminations at both ends. In the Rosemount Tank Gauging system, a trunk is typically located between the Rosemount 2410 Tank Hub and a segment coupler or the last device in a daisy-chain configuration.

Communication/display/configuration specifications

Tankbus

The intrinsically safe side of the Rosemount 2410 connects to the Tankbus, which communicates with the field devices on the tank using FOUNDATION™ Fieldbus.

Fieldbus

Rosemount 2410 communicates with a Rosemount 2460 System Hub, Rosemount TankMaster, or a host via the supported communication protocols for the primary and secondary fieldbus.

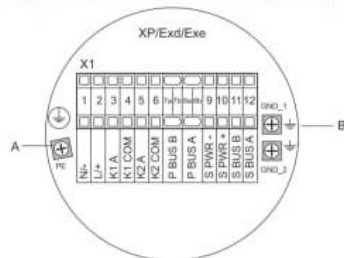
Primary fieldbus: TRL2 Modbus, RS485 Modbus, Analog output/input 4-20 mA/HART or Enraf®

Secondary fieldbus: TRL2 Modbus, Analog output/input 4-20 mA/HART, WirelessHART® or other vendors' protocols, such as Enraf, L&J Tankway and Sakura MDP/V1

For combination guidance, see [Table A-1](#) and [Table A-2](#).

.4.11 Non-IS terminal block

Figure 3-17: Terminal Block in the Explosion-proof/flameproof Compartment



- A. Ground screw
B. Ground screws for communication bus shields

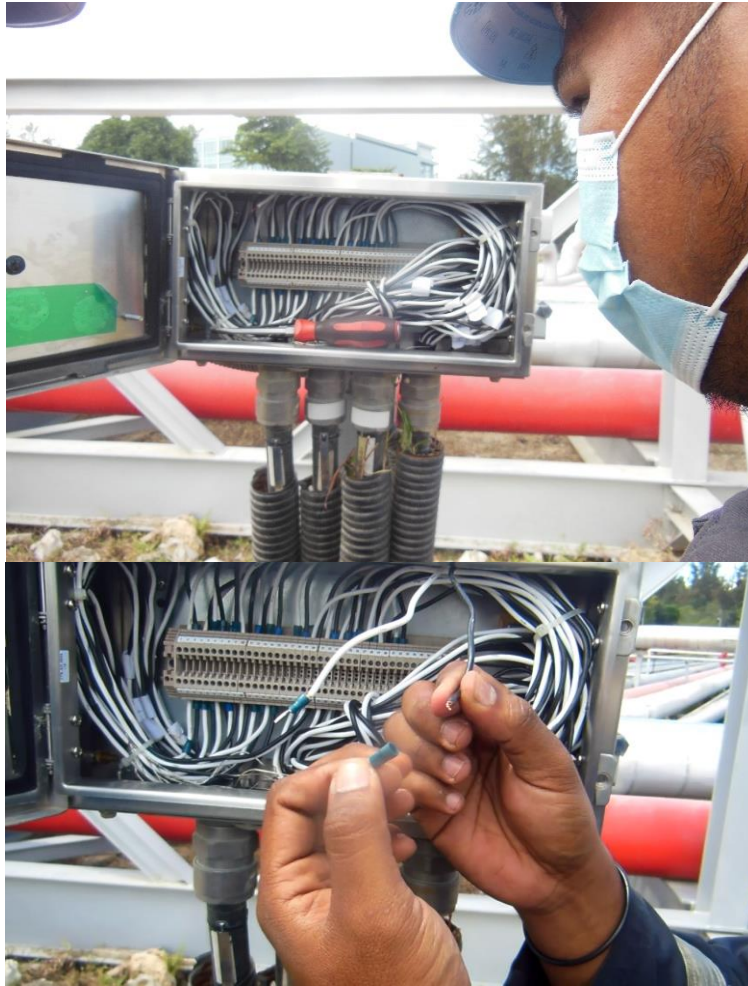
Table 3-8: Terminal Assignment for Non-Intrinsically Safe Side 54/192

Terminal	Designation	Function
1	N / -	Power, Neutral / DC -
2	L / +	Power, Line / DC +
3	K1 A	Relay 1 output (optional). Hardware configurable NO/NC.
4	K1 com	Relay 1 common
5	K2 A	Relay 2 output (optional). Hardware configurable NO/NC.
6	K2 com	Relay 2 common
7a/7b	P Bus B	Primary communication bus
8a/8b	P Bus A	
9	S Pwr -	Secondary bus power - (optional)
10	S Pwr +	Secondary bus power + (optional)
11	S Bus B	Secondary communication bus - (optional)
12	S Bus A	Secondary communication bus + (optional)
PE	PE	Power supply protective ground
GND_1	GND_1	Housing chassis/shield Primary bus
GND_2	GND_2	Housing chassis/shield Secondary bus

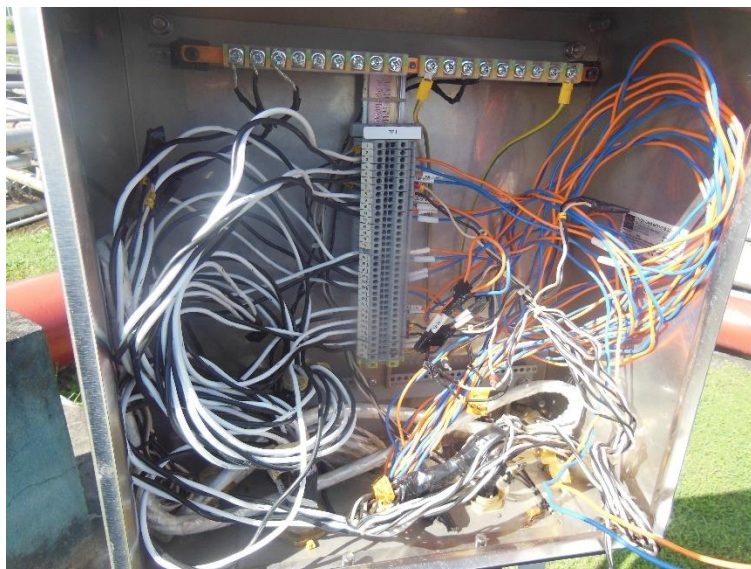
Table 5: Allowed Cabling Distances for Different System Configurations

Cable diameter	Loop resistance	Maximum cabling distance from power source to all devices on the tank		
		With maximum power usage of 250 mA Distance in m (ft)	With typical power usage of 128 mA for 5900S, 2240S, 2230, 3051S Distance in m (ft)	With typical power usage of 178 mA for 5900S 2-In-1, 2240S, 2230, 3051S Distance in m (ft)
20 AWG (0.5 mm ²)	66 Ω/km	212 (695)	414 (1358)	298 (978)
18 AWG (0.75 mm ²)	42 Ω/km	333 (1092)	651 (2136)	468 (1535)
17 AWG (1.0 mm ²)	33 Ω/km	424 (1391)	829 (2720)	596 (1955)
16 AWG (1.5 mm ²)	26 Ω/km	538 (1765)	1000 (3281)	756 (2480)

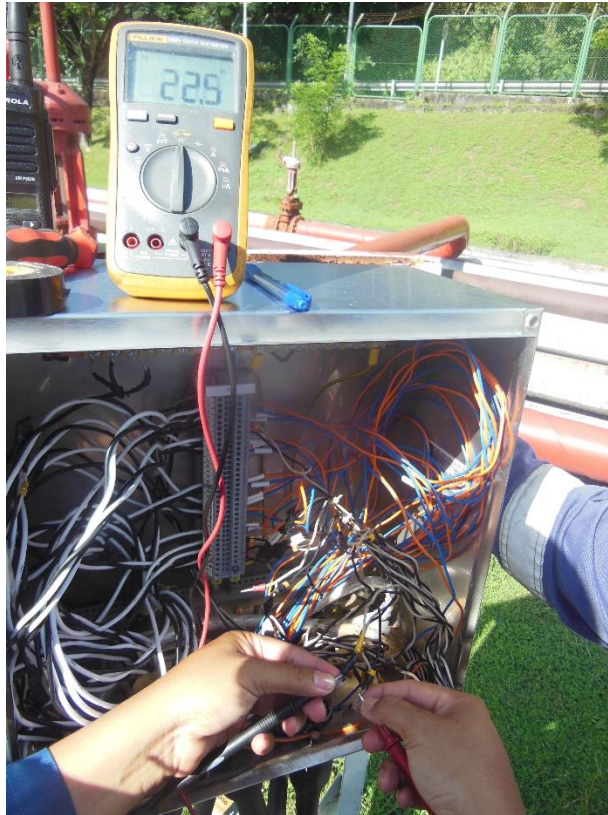
The typical cabling distance from the tank hub toward the control room is up to 4 km (2.5 miles) depending on which protocol is used.



TJB Pintu 4



TJB MA4 lama



Resistansi kabel lama tjb 4 lama ke OM



Resistansi Kabel fb dari TJB MA4 lama ke OM

