

Set of Exercises

With answers!!

**K-Chief 700 Maintenance Course
on**

KM Drill 8



KONGSBERG

Set of Exercises

Use of this document:

All tag names, terminals etc., which must be adjusted to the delivery, are written in **red** text.

Names of Dialogue boxes, tools etc. that need to be emphasize are written in **blue** text, but usually only once.

Information text are written in **green** text

All exercise answers are written below each question in **green hidden** text.

When converting this document to project specific exercises set:

Remove DMS document no.

Fill in type of course on front page.

Fill in project no and vessel name in header.

Edit date in footer when changing the document.

Set of Exercises

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Exercise 1. System Status, Maintenance [Module 16.02.02](#)

1 PS032 is almost always operational

2 Use any operational PS

1. What is the Status of PS054?

“Operational”

2. When was PS171 started up?

3. Open Station Explorer for PS048. What type of RIO unit is in slot number 7?

RDIOR420

4. How many configured IO-points on this RIO unit are inputs?

16 inputs

5. Which OS was the Config Load server for PS046? OS31

6. How can the Net status page be updated?

Right click in the page, select update statistics

7. Is it possible to see the IP address for the OS's?

Yes, on the net status page

8. On the “PS Status” page coloured flashing cells indicates alarms. How can you easily see alarm details?

Right click on wanted PS, select System Events for Node (and Subnodes)

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Exercise 2. Station Explorer, Maintenance Module 16.02.02

- 1 PS032 is almost always operational
- 3 Use a PS with profibus connected
- 4 Use a PS with both serial lines and profibus is connected

1. Open System Status image, right click on **PS201** and open Station Explorer. Can you find Station Explorer window in another way?

Tools -> Station Explorer

2. How many RIO-units are connected to **PS201**? What types of RIO-units are connected to this PS?

6 RMP4420 + 1 RDIOR420 + 2 RPC420

3. Change Station Explorer to **PS046**. How many RIO-units and Profibus slaves are connected?

12 RIOs + 1 Profibus (HVAC_Hull)

4. Change Station Explorer to **PS053**. How many serial lines and profibus lines are connected? Is there any connection using NetIO?

Modbus to MGE_C2 - 0 Profibus. 3(PS-241-SIMIO is only for SIMULATION) NetIO connection

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Exercise 3. Operation Repetition Module 16.02.02

2- Use an analogue measurement connected to IO and to other modules, with alarms configured and shown in a process image

1. Use Station Explorer for **PS203** to open RIO unit **RMP420** in slot **3**.
2. Use the IO Block and find which IO-point is used for **MIC-023604/Running?**

IO-point 7

3. Find this module using the Find tag function.
4. Open Alarm Limits window and find all alarms configured on this module. What is the colour code for alarm priority?

OutFailure, Incons, TimeOut! Low=Yellow, High=Red, Emcy=Magenta

5. Is it possible to find the module in process image?

Yes

6. Can you find the Max Start/Stop limits in Parameter View of the module?

Yes, 10 sec

7. Use Show Connection function and find if this module is connected to other modules.

Yes, 5 connections to other software modules

8. Can you open IO block view by using Show Connection?

Yes, by clicking the IO-button

Set of Exercises

Exercise 4. IO-list [Module 16.22 \(IO-list from OceanRig Corcovado\)](#)

Print out some pages of the actual IO-list. Find one module

You have got information that the Running feedback of **MIC-081235** is not read by **K-Chief 700**. Use the attached IO-list and find the following information for the signal:

1. Which FS-, and PS-number:

[FS40 / PS40](#)

2. RIO position (slot) and type:

[Position U07, RMP420](#)

3. Channel number:

[Channel 15](#)

4. Loop typical used:

[Loop typical DI-01 X2:20-22](#)

5. Can you find some of this information in the OS? Compare with Function module **MIC-111201** in KMDrill8.

[Everything, except the loop typical](#)

Set of Exercises

Exercise 5. FS-400C-R1 [Module 16.22](#)

One question from each chapter

Use the FS-400C-R1 Maintenance Manual in the Reference Manual:

1. How many RIO modules can be mounted in a FS-400C-R1?

[12, 1.1 s.5](#)

2. How many of them shall be grounded?

[The Rio Modules are usually not grounded, 1.5.2 s.8](#)

3. Why is the RBUS connected to P3 connector on RBus Term Card?

[The RBUS is terminated at connector P3, 1.6 s.9](#)

4. One RIO module in this FS-400C-R1 has lost contact with one RCU.

Local LED is red. What is the probable error source?

[Defect RIO module or lost connection on RBus for this RCU, 2.4 s.14](#)

5. What is recommended interval for checking connector locks?

[Once year, 3.4 s.17](#)

6. The Power Supply PSU2 is broken. Which circuit breakers should be turned off before the PSU is removed?

[Q1 and Q2, 4.1 s.18](#)

7. What is the current specification of the fuse used in X41:F2-F4?

[6.3A s.22](#)

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Exercise 6. Units and wiring on lab rack [Module 16.50](#)

Use Basic power & wiring diagram for FS-400C-R1, two pages

1. Use Power & wiring diagram, drw no **323448**, two pages. Identify the different units on the lab rack and check the powering according to the drawing. Is it some components that are missing on the test rack, compare to FS-400C-R1?

[power alarm, power outlet and lamp.](#)

Set of Exercises

Exercise 7. RCU502 Module 16.23.01

Doc no 300991/A

Use the slide RCU502 Start-up Sequence in the presentations:

1. When you start up a RCU the boot sequence stops and the four status

LEDs are: ST0 = light (1)



ST0

ST1 = dark (0)



ST1

ST2 = light (1)



ST2

ST3 = dark (0)



ST3

What is wrong?

FPGA Test, see last slide in RCU502 ppt.

Use the Hardware Module Description of the RCU502 to find the following information.

2. The fan in a RCU is broken. Is it possible to change it?

Yes. See procedure 6.2 p.37

3. A RCU is broken and needs to be replaced; you must set the address on the new unit. Where to set it and what to set when the MAC address is 02:41:4C:42:12:29?

MAC1:2, MAC2:2, MAC3:9, 2.1.4 p.13

4. What are the two colours of the Run/Error LED?

Green/Red, 2.1.6 p.14

5. Which connectors are used as Serial Link Interface?

P21 - P26 2.6 p. 18

6. What type of connector is used for the RBUS interfaces on the RCU?

Shielded female RJ45, 4.6 p.23

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Exercise 8. RHUB200-5 Module 16.24.01

Doc no 300994/B

Use the HW Module Descriptions in the Reference Manual:

1. What indicates a fixed green Status LED on the RHUB200-5?
Module OK, contact with at least one RCU, p.10
2. How many RCUs is it possible to connect "upstream"?
Three (triple redundant), p.8
3. How many "downstream" connections are possible with the RHUB200-5?
Five (4 internal and 1 external), p.8
4. If a RHUB200-5 has to be replaced; are there any settings you need to change on the new unit?
No p.22

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Exercise 9. RBUS-Term Module 16.24.02

Doc no 311167/C

Use the HW Module Descriptions in the Reference Manual:

1. What is the main purpose of the BUS-Term card?

Termination board for RBUS, p.5

2. Use Figure 3 on page 8 in the Hardware Module Description; which connectors are used on the RBUS-Term when used in a Field Station?

XP1 (from RCU/HUB), P1 to RIOs, P3 from RIOs, p. 8

3. What is the resistance of the R_T resistor on P3?

100Ωm, p.7

4. Are there any configuration needed when replacing a BUS-Term?

No, just use XP1, P1 and P3 or P2 as on the old card, p. 18

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Exercise 10. RIO Units General Module 16.25

Doc no 311163/B and 311165/B

Use the RDIOR420 and RMP420 HW Module Descriptions in the Reference Manual:

1. The RIO units are connected to the RBUS. Which connectors and what type are they?

RS485, P1 and P2 9-pin male D-sub , p.20/21

2. What are the power requirements for the RIOs?

24 VDC

3. How many connection points are there for power?

4 terminals (X1 .. X4)

4. How many of the power connections must be used?

One on each side x2 and x4, note on p. 7/8

5. What can happen if only one of the power connections is used?

The current can be too high. p.7/8

6. If you must replace a RIO unit, are there any settings on the new unit that needs to be configured?

Yes, the module address (slot no.) must be set. p.25/28

7. How can you see that a RIO unit is OK and communicate on the RBUS?

Green LED in front of the RIO unit p.8/9

8. The green LED in front will flash. Can the flashing have different frequency, and can you see anything about that in SW?

Yes, depending on scan task / Yes, in "Process Bus IO image" (choose detailed view)

9. All channels on RMP420 and 16 on the RDIOR420 have a HSD (High Side Driver) for driving the 24Vdc loop. What is the maximum current for one HSD?

1 A

10. What happens if the current exceeds that?

Set of Exercises

(HSD) is switched off by the firmware, and status is reported to the system operator, p. 8 (RDIOR) p. 10 (RMP)

11. If there has been an HSD overload, what must be done before your system returns to normal?

An operator command in the application system might be necessary; HSD restarts itself p. 8 (RDIOR) p. 10 (RMP)

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Exercise 11. RMP420 [Module 16.25.01](#)

Doc no 311165/B

Use figure 3 on page 11 in the RMP420 HW Module Descriptions in the Reference Manual:

An analogue voltage input signal shall be connected to a RMP420 unit.

1. Which channels can be used?

[All channels](#)

2. What is maximum range in voltage of the signal?

[0-10V](#)

3. If it is to be connected to channel 28, which terminal block is it on?

[X4](#)

4. How many and which channels can be used for pulse frequency on a RMP420?

[Ch 31 and 32](#)

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Exercise 12. RDIOR420 Module 16.25.02

Doc no 311163/B

Use the RDIOR420 HW Module Descriptions in the Reference Manual:

1. What does the last R in RDIOR420 stands for?

R stands for Relay

2. Is it possible to connect a digital output signal to this unit?

Yes

3. If yes, must a specific channel be used?

9-16. 25-32 (X2, X4)

4. How can you see in software if it is an input or output?

Look at the arrows in the IO Terminal Block or IO Point Browser

5. What is the maximum switching current on the relay?

5 A

6. What is the min/max field loop power for the relay contacts?

15-300Vdc or 15-250Vac S.16

Set of Exercises

Exercise 13. RDIO420S Module 16.25.03

Doc no 323936/B

Use the RDIO420S HW Module Descriptions in the Reference Manual:

1. What does the S in RDIO420S stand for?

S stands for Safety

2. Is it possible to connect a digital output signal to this unit? If yes, must a specific channel be used?

Yes / No (Group of eight have to be the same type DI or DO)

Ch 2.6 and 2.7 p. 8->

3. What is FOST?

Final Output Stage Test. Switching the element on or off for a very short time and reading its feedback for confirmation of functionality. Ch 2.7.3, p. 17

4. What is PDU?

Power Down Unit: A safety switch that trips when the monitors detects an HSD that cannot be turned off the normal way. Thus the monitor can turn off the whole group of eight channels using the PDU. s.15

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Exercise 14. RMP420S [Module 16.25.04](#)

Doc no [323935/B](#)

Use the RMP420S HW Module Descriptions in the Reference Manual:

1. What types of signal can be connected to an RMP420S?

[All 32 IO-points are analogue inputs: 4-20mA \(0-20mA\) or 0-10V ch. 3, p. 17](#)

2. If the unit is used in a redundant RIO topology; what type of inputs signals have to be used?

[AIV, 2.6 p. 14](#)

Set of Exercises

Exercise 15. RPC420 Module 16.25.05

Doc no 178318

Use the RPC420 HW Module Descriptions in the Reference Manual:

1. What is the function of a RPC420 card?

Interface between a thruster panel (levers, buttons, indications and leds) and the controller (RCU) ch. 1 p. 7

2. What is the communication type between the RPC420 and the controller?

RBUS (RS485)

3. What is the purpose of the DIP switches next to the RBUS connectors?

Set correct line Impedance, ch. 4.12, p. 38

4. If a RPC420 card has to be replaced are there any settings remember?

Set the correct two digit address

5. Is there any indication on the card if there is an error or not?

Green led if OK

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Exercise 16. Redundancy Module 16.26

Use K-Chief 700, the Online User Guide and the presentations to find your answers:

1. Open System Status and PS Redundancy; which types of redundancy are used on your vessel?
 1. Single/ HotStandby / 1oo2 /
2. Open Redundant Station Dialog Box and press F1; Can a PS be Master and Offline in a HotStandby system?
 2. No, the Master is always online
3. What is a redundancy group?
 3. Set of PSs working together
4. In the PS Operation dialog box, it is possible to "Set configuration mode"; when do we need to select this mode?
 - When making changes in PS configuration mode in a redundant system
5. Where can we find information about errors regarding redundancy?
 - Redundant Stations Dialog Box

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Exercise 17. IO SW Module 16.27.01

1. Use a pump where at least terminals Start, Stop, Running and Remote are connected to IO

Use the OS (KM Drill8):

1. Find tag **MIC-111101**. Use Show Connection and find how many terminals on this module that are connected to RIO-units?

8

2. Open the IO Point Browser from the module right click menu and verify that the answer from question 1 is correct.

Yes, 5!

3. Find tag: **MIC-081225**. Open IO Terminal Block for the **Start** terminal. What type of RIO unit is it and which PS is it connected to?

RMP420 / PS054

4. Which IO Point number is the **Start** terminal connected to?

IO-point 12

5. Are all IO signals on this module connected to the same RIO unit?

Yes

6. On this RIO, how many signals are analogue?

0

7. How many IO Points are inverted?

2

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Exercise 18. Loop Typical Module 16.27.01

4. Use a control valve

Use the Loop Typical list in the Reference Manual and your OS to find:

1. To what type of RIO-unit can an internal powered, 2-wired input field instrument (0-20mA) be connected?

RMP, RAIC, RMP-S

2. If you are using RMP420 and IO Point 11, where to connect the device in question 1?

To a RMP420, (RAIC420, RAIT420, RAOC420)/ Terminal X2: 7-9

3. What is the difference between loop typical AI-01 and AI-02?

Int/ext power

4. We have a relay output signal. What type of RIO unit to be used?

RDIOR420

5. You have got an alarm on SOV-112553 that the feedback Position is not responding. Find correct loop typical for this signal and where to look in the HW.

- FS no: FS47
- RIO no: 7
- Loop typical: AI-01
- IO point/Channel no: 1
- Terminals no: X1: 1/3

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Exercise 19. Changing IO Point Module 16.27.01

1. Use a digital input module
2. Use an analogue signal and move it to a terminal of another type

1. The IO Point for the **Remote** terminal of **MIC-081203** is broken:
Change it to another IO Point.
2. On PS053, RIO unit **10**, change IO Point **2** to IO Point **5**. Remember signal conditioning.

Set of Exercises

Exercise 20. MP8200 Module 16.28.02

Use the MP8200 Maintenance Manual in the Reference Manual:

1. Is it possible to use a standard mouse instead of the trackball? Which connector would you use for the mouse?

Yes, the mouse connector or an USB,p12

2. Of what type is the Hard Drive in the MP8200?

System disk, Flashdisk, 32GB, Transcend SSD drive, p. 51 / 19 (spare parts)

3. How can you release the lid on the computer?

Press the two cabinet lid locks inwards to release the lid and pull the lid towards you, p26

4. Are you allowed to replace the power supply module?

Yes, p 38

5. What are you not allowed to do in an MP8200?

Corrective maintenance of parts not provided in the replaceable parts and recommended spare part list, p51

Power Supply Unit, MICRON C400 128GB 2,5" SSD, Memory, 2GB, PC3-10600, DDR3-1333MHz (In addition some parts for the HS model and H model) p 43

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Exercise 21. OS Maintenance [Module 16.28.01](#)

Use the OS-650-KM05 Maintenance Manual in the Reference Manual:

1. How can you access the alphanumeric keyboard?

[In front of the operator panel, push the drawer and release the keyboard, p 15](#)

2. The trackball needs to be cleaned. What is the procedure for doing it?

[p 45](#)

3. There is no response to the cursor on the screen when operating the trackball. How do you find out what is wrong?

[The unit can be broken, check connection from USB port to input panel, it could also be dirty, clean it.](#)

4. What is the input panel part number?

[330951, p 61](#)

5. What is the power supply part number?

[300821, p 58](#)

Set of Exercises

Exercise 22. BU-AUT panel, Input panel and ALC panel Module

16.28.04

Use the BU-AUT HW Module Descriptions in the Reference Manual:

1. What is the power requirement of the BU-AUT panel? Where is the power connected on the panel?

18-32V DC p 6, X10 1-3 p 11

2. How does the panel communicate with the controller computer?

Through a single USB, p 7

3. What address should the panel have if it's only one panel in use?

0, p 7

4. How many bolts must you remove to replace the panel?

4, p 13

Use the Input panel HW module descriptions:

5. How does the panel communicate with the controller computer?

Through a single USB, p 7

6. How many terminals is it on X1?

Two fourteen-terminal, p 12

7. What is the colour of the status COM LED?

Green, p.8

8. How do you replace the panel (what page in the HW module descriptions)?

p 17

Use the ALC panel HW module descriptions:

9. What is the ALC panel used for?

Command control and alarm control p 5

10. What is the input voltage on the panel?

5Vdc, p 6

11. What happens if the temperature sensor on the panel rises over the limit?

A system alarm is given, p 9

Set of Exercises

Exercise 23. Watch Call Maintenance [Module 16.14.01](#)

1. The CAN-bus needs termination. Where should the termination be and what is the resistance value?

[On the first OS and the last WCU JB / 120Ω. Drawing 351742](#)

2. What is recommended interval for Lamp and Buzzer test on the Watch Call units? How do you carry out this test?

[Weekly / Press the LAMP TEST button and verify that the LEDs illuminate and the buzzer sounds, p 22.](#)

3. Which parts are you allowed to replace? What is the part number of a Watch Cabin Unit (LCD type) front panel?

[Any item listed in "Replaceable parts" and "Recommended spare parts" / 3900144, p 24](#)

4. What is the power requirements and ambient operating temperature for a watch call panel?

[Voltage Input: 18-32 VDC, Power consumption: 6W](#)

[Ambient operating temperature: 0°C to +70°C](#)

[p 9](#)

Set of Exercises

Exercise 24. Serial lines connection Module 16.29.01

Use Loop Typical SL-100 (RCU 501) and RSER200-4 Hardware Module

Description:

1. In one FS we discover a bad connection to a RSER200-4. We find that:

- The TPC cable is connected to connector P22 on RCU B.
- The field cables are connected to 1, 3 and 4 on X3.

Find:

Serial line type: RS232

Serial channel no: Channel: 7

2. From an OS we find out that the peripheral equipment connected to serial port 2 on PS32 does not communicate. RS422 is used.

Where to check the HW?

FS:

FS: 32

Connector on RCU:

Connector: P21

RSER200-4 Module No:

RSER200-4 No. 1

Terminal Block:

Terminals on X2

Terminals used:

Terminals: 1,2,3,4,5

Set of Exercises

Exercise 25. RSER200-4 Module 16.29.01

Use the RSER200-4 HW Module Descriptions in the Reference Manual:

1. What information do we get from the LEDs on the front panel?
Status of unit, and data traffic both upstream and downstream.
2. How many serial lines can one RSER200-4 control?
4 serial lines s.4
3. Is it possible to use both RS232 and RS422 on the same RSER200-4?
Yes
4. List all Serial Line interfaces possible on the RSER200-4?
RS232, RS422, RS485, NMEA 0183
5. How is the RSER200-4 powered?
by the RBUS connectors on the "rail".

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Exercise 26. Start of RCU Module 16.50

Hardware and software needed:

Application: vcXXXX vessel name

Use OS with IP: 172.21.xxx.xx

Rack with two RCU500, RDIOR400 and RMP400

PS n: RC500 address xxx

RIO unit addresses as specified in exercise 2

Set RIO in Exceptional mode NONE

To simulate signals:

Two digital sensors, loop calibrator and "PT100"(resistor)

Before start of exercises:

Set wrong address on RCU A

No RBUS cable connected from RBUS Term to RIO's

Disconnect net cable

Disconnect Running terminal on the SW-module that shall be used (Motor)

1 Find the correct address for selected PS in the Ethers file. Tips: Use a PS that have a pump or motor in manual with terminals "Remote" and "Running" connected to a RMP400, and "Start" to a RDIOR400. There should be an analogue measurement nearby, e.g pump current

1. The **RCU 501** to the left on the test rack must have the following MAC addresses to work as **PS54**:

Net A: 02:41:4c:42:12:36 and Net B: 02:41:4c:42:22:36 **236**

(Set the correct address on the **RCU** using the three last digits)

2. Are there other settings and connections that must be checked on the **RCU** before starting it up? **No**
3. Turn on the power to the **RCU**.
4. In **K-Chief 700** check the System Status image that **PS54** is operational.
5. Use System Status image: How many RIO units on **PS54** configuration have errors? **12**
6. Open Station Explorer for **PS54**. What does a red arrow (↓) indicate?
7. Are there any entries (sub nodes) under Default driver that has active alarms?
8. If yes; what are these alarms?

Failure in a lower level, no connection on Term card

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9. Open "System Events for Node and Sub Nodes" for the section IO Manager and acknowledge the alarms; check for changes in the alarm symbols used in Station Explorer.
The symbols have changed from bell to circle
10. Log on as user **Kongsberg**, password: **kongsberg**.
11. Set **PS54** in NONE Exceptional Mode (No simulation algorithm and no Alternative terminal input). (Hint: Operation -> PS Operation).
12. Open the **Event List** and acknowledge alarms generated from **FS54**.
13. Open the process image ` **Bilge System Ballast pump Room` using the Navigator. Find the **No.1 Drain Pump**.**
14. What is the tag name of this module? **MIC-081225**
15. What does the tag mark beside the pump symbol mean?
Module description, L=local Control
16. Open Alarm Limits view of the **MIC-081225** and find which of the terminals that have defined alarm.
Outfailure, Error, Incons, Timeout.
17. What are the alarm priorities and texts?
All pri Low and trigger on high signal.

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Exercise 27. Start of RBus and RIOs Module 16.50

Before start of exercises:

RBUS loop cable disconnected

Wrong addresses on RIOs

All sensors disconnected.

Note: All connections must be done with the power turned off

1. You shall get the RBus A up running in a single system.

To which connectors should the RBus cable be connected on RCU and Hub?

P19 and P1

2. Make sure that the RCU is running and that the RBUS Term and RIOs are still powered off; check on Process Bus IO image which types of RIO units that are connected to this RCU

RIO unit types:,

RMP 420, RDIOR 420

3. RIOs connected to PS54 and used in this exercise have the configuration shown in the following table:

Card type	Address
RMP420	2
RMP420	9
RDIOR420	13

4. Connect the cable loop to the correct RIO units.

Connectors on RBus Term:,

Connector on RIOs

XP1, P1, TERM P3, RBUS A

5. Switch on power for the hub and the term card. How can you see that the power is OK on the hub?

6. How can you see if it is data traffic on the RBUS?

Flashing LEDS on the HUB.

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7. Set the correct addresses on the RIO units and turn power on. How do the RIO units indicate that they have the correct configuration and address?

Green LED

8. Are there any changes on the RBUS Hub now?

Flashing

9. Open Station Explorer and find that the units are OK.

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Exercise 28. Redundant RCUs

Module 16.50

You shall now connect and get the RCU B up and running in a redundant system.

1. Redundant pair of: 54 and 154 (Redundancy group FS054)
2. RCU addresses:
PS54: 02:41:4c:42:12:36 PS154: 02:41:4c:42:12:9a
Set the correct addresses on the RCUs. Is it necessary to restart the RCU? What about the OS?

RCU: Yes OS: No

3. Where are the redundancy signals between the two RCUs connected?
P10 to P11 on both controllers.
4. Check if both RCUs are OK on System Status.
5. Where can you check that they run as a redundant pair? PS
Redundancy
6. Which PS is online? Is it possible to see that both in HW and SW?
Redundant Stations or System status
Online: One of them
HW: LED ST4
SW: Redundant Stations or System status

7. Make sure that the RBUS Cable is connected for RCU B.
8. Check/set RCU A to be Online/Master
9. Check for errors in the Redundant Stations view.
10. What is the capability of the two RCUs? OK
11. Disconnect the RBUS A cable from one of the RIO units, and check alarms and redundant stations dialog box; did it lead to a redundancy switch?

No

Set of Exercises

12. Reconnect the RBUS Cable.
13. Disconnect the RBUS connection on TERCARD for RCU A? Check alarms and Redundant Stations dialog box; did it lead to a redundancy switch? No
14. Reconnect the term card.
15. Disconnect the connection between RCU A and Hub A. Check alarms and Redundant Stations dialog box; did it lead to a redundancy switch? No
16. Reconnect Hub A.
17. Disconnect the connection between RCU A and Net A. Check alarms and Redundant Stations dialog box; did it lead to a redundancy switch? Yes
18. Reconnect Net A.
19. Is it possible to switch master manually?

Set of Exercises

Exercise 29. Digital input signal Module 16.50

Note: All connections must be done with the RIO power turned off.

Activation of the Remote signal on **No.1 Drain Pump**.

MIC-081225 will be set in Remote mode to be controlled by K-Chief 700.

1. Find which type of RIO unit and IO Point number the input terminal Remote is using. How is this signal conditioned on the RIO?

RIO type..... RMP420 IO Point 15

2. Do you have such a unit in the rack?

3. What is the address of the RIO?

Address.....

9, Yes RMP 420

4. Connect a digital switch to the correct IO Point on the RIO. Check connection as recommended in loop typical.

Loop Typical no:

Terminal number for "Signal" on RMP420:

Terminal number for "Common" on RMP420:

DI-01, X2:19/21

5. Set the digital switch to ON.

Open Terminal View and check the value of the Remote terminal.

What is happening on Process Image?

6. Can you observe any difference on the Operator Menu?

7. Change the field value to 0. What happens now? (Remember to acknowledge alarm)

The start and stop signal disappear when Remote is 0, tag mark change between m and L

8. Is it possible to see somewhere on the HW that the signal is high?

Use a voltmeter and measure the value between the two terminals when the signal is ON and OFF.

ON value: V OFF value:V

9. Let the pump be in remote mode.

Set of Exercises

Exercise 30. Analogue input, current signal

Module 16.50

Note: All connections must be done with the RIO power turned off.

We will measure the current of the **No.2 MGEN CURRENT L1** in `DG2P` using module: **IIAH-031211A**.

1. What type of RIO unit is the **ProMeas** terminal connected to.
2. Which IO Point is used for this connection?
3. What is the scaling of the signal?

Unit type: RMP420, U02

IO Point: I/O 4

Sensor max: Sensor min: 4-20mA

Eng max: Eng min: 0-550 A

4. What is the address of this RIO unit?
5. Verify that this address is the one on the RMP420 unit connected.

Address:

03

6. Open Alarm Limits for module **IIAH-031211A** and check the alarms configured.
7. Add a Deadband of 5 on the High alarm.
8. Connect the 4-20mA simulator to the terminals on the RIO (3 wired field instrument). Use internal loop power. Check if everything is correct, as recommended in the loop typical.

Loop Typical no: AI-12

Terminal no for +: X1:10

Terminal no for - : X1:11

Terminal no for Signal: X1:12

9. Test connection by changing the value of the simulator. Do the alarms work?

Set of Exercises

Exercise 31. Digital output signal

Module 16.50

Note: All connections must be done with the RIO power turned off.

Manual start request of **No.1 Drain Pump (MIC-081225)**.

A manual start request from the operator menu will set output terminal **Start** to 1 and send this signal to the pump.

1. Find the RIO unit connected to the **Start** terminal.
RIO unit type and number: RMP420/9
IO-point used: 12
Loop Typical no: DO-01
2. Try to start the pump. What happens on the process image? Why?
We will come back to that.
The pump gets yellow (transient)
3. Check the signal on the IO Terminal Block; what happened on the RIO unit?
4. Use a multimeter and measure DC Voltage on the RIO while trying to start and stop the pump (or connect a lamp to the correct terminals).
Sensor=24 V. After some seconds going back to 0 V
5. Stop the pump and acknowledge the alarms if there are any. If you now try to start the pump, you will get an alarm after some seconds. Why is this alarm coming?
No running feedback from the pump
6. What are the start/stop time out limits?
10 seconds

Set of Exercises

Exercise 32. Digital input signal - configuration of signal Module

16.50

Note: All connections must be done with the RIO power turned off

Running feedback from the No.1 Drain Pump (MIC-081225).

1. The running feedback on MIC-081225 is not configured. Because of practical reasons, we want to use the same RIO unit as the Start signal. Is that possible?
2. Which IO Point do you want to use? Configure the Running signal.
IO point:
Terminals no:
Disconnected Channel 14 on RMP420/09
3. Connect a switch to the RIO. Set the switch to ON and check the signal on the IO Terminal Block.
4. Check the module for alarms, are there any new alarms? If yes; why do you get an alarm?
5. Set the signal back to OFF and acknowledge any alarms on the module.

We will now simulate a start of the pump.

6. Start the pump from the operator menu and verify that the start signal is sent out to the pump. Simulate a Running feedback signal with the switch within the time out limit configured. What happens?
The pump symbol gets green
7. Stop the pump.

Set of Exercises

Exercise 33. Analogue input signal, PT100 element

Important: Do not connect any sensor to the RIO without first configuring the IO Point in software.

Module 16.50

Use a temperature measurement with PT100 sensor

1. Find module **TIAH-031221**. This is a temperature sensor (PT100). Which RIO unit and IO point (Channel) is this signal connected to?

RIO:

RMP420 /U2

IO point:

IO-point 13

2. Check loop typical and connect a PT100 simulator to the RIO unit to simulate the temperature.

Loop typical:

AI-15

Terminals no:

X4: 13/14/15

3. Open parameter view and terminal view and check that the engineering value is the same as on the IO Terminal Block?

4. What are the alarm limits? Are there connections to the limit terminals of this Function Module?

Alarm limits: High alarm, 140, priority Low

HighHigh alarm, 155, priority High

Actions are connected on H and HH

Set of Exercises

Exercise 34. OS backup / restore [Module 16.50](#)

1. Make a backup of the Operator Station using a portable USB hard disk. Follow the procedures in the document named "MP8200 Backup/Restore, and XP Installation Procedures" (330249/A)
2. Use the backup file from the previous exercise to restore the Operator Station. Follow the procedures in the document named "MP8200 Backup/Restore, and XP Installation Procedures" (330249/A)