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HiPAP® 602/502/452/352/102/HAIN system

Cable plan and interconnections

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Document history

Revision	Description of change
H	New 602 system, Hull Unit Controller (HUC) and HSC-1x computer added.
I	Updated Hull Unit Controller cable drawing. Removed old systems. Added HAIN

References

	Doc. no.	Description
1	396013	HiPAP Instruction Manual
2	419427	HiPAP Hull Unit Instruction Manual
3		
4		

Disclaimer

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Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment. Kongsberg Discovery disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

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1 CABLE PLAN

1.1 Cable specifications in the table

Cable no:	The W-Uxx number (Wire –UNAVxx)
HIPAP cable no.:	001 - xxx : Top system (Ship/Rig) and Hull Unit connections Identical cables same number with a, b, c... Example: W-U00xa, W-U00xb, W-U00xc,...
KD cable ID	HiPAP System: W-U001 - W-Uxxx HAIN W-H001 – W-Hxxx
Core no W-U or W-H	The cable core number or colour.
Cable from/ Connection type	The name of the unit the cable comes from Plug/Table block etc
Term/Plug Pin no.	Terminal (TB) or plug (P) number The connection pin
Cable to/ Connection type	The name of the unit the cable goes to Plug/Table block etc
Term/Plug Pin no.	Terminal (TB) or plug (P) number The connection pin
Cable type/spec Signal	Cable type or specification for the cable The signal function Rx, Tx, Up, Down etc
Signal type	Signal type, serial, analogue, Ethernet etc
Ref. plug layout/ cable	Reference to connector illustration/cable overview

1.2 HiPAP Operator Station with HSC 1-ix computer

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U001	Display	DP/DVI/HDMI	Computer	USB-C /DP/MiniDP	Special w/converter	VIDEO	
W-U002	Keyboard		Computer	USB	Special included	USB interface	
W-U003	Mouse/trackball		Computer	USB	Special included	USB interface	
W-U005	Printer		Computer	USB	Special included	USB	
W-U006a	Mains socket	Vessel UPS/Fuse: F	Display	IEC	Power	115/230 VAC	2.5.3 Power cables
W-U006b	Mains socket	Vessel UPS/Fuse: F	Computer	IEC			
W-U007	EMC Ground	Screw terminal	Computer		EMC optional cable	EMC ground	
W-U009a	Computer (serial card slot C)	Port 1 / 9-pin D-sub M	Attitude sensors/ telegram output/ external interface/ external synch/1PPS	Example (9 pin D-sub/1PPS unit)	Serial line/ split cable 3x2x0.5 w/screen	RS-232	2.5.4 D-sub plug for RS- 232/RS422
		Pin 1 Carrier detect					
		Pin 2 Receive data		Pin 2 Data output			
		Pin 3 Transmit data					
		Pin 4 Data term ready					
		Pin 5 GND		Pin 5 GND			
		Pin 6 Data set ready					
		Pin 7 Ready to send					
		Pin 8 Clear to send		Pin 8 1PPS out			
		Pin 9 not used					
W-U009b		Port 2 / 9-pin D-sub M (identical to W-U009a)	Attitude sensors/ telegram output/ external interface		Serial line/ split cable 3x2x0.5 w/screen		
W-U009c		Port 3 / 9-pin D-sub M (identical to W-U009a)			Serial line/ split cable 3x2x0.5 w/screen		
W-U009d		Port 4 / 9-pin D-sub M (identical to W-U009a)			Serial line/ split cable 3x2x0.5 w/screen		

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U010a	Computer (serial card slot D)	Port1 / 9-pin D-sub M	Attitude sensors/ telegram output/ external interface	Example	Serial line/split cable 3x2x0.5 w/screen	RS-422	2.5.4 D-sub plug for RS- 232/RS422
		Pin 1 TxD- (A)		Pin_a RxD-			
		Pin 2 TxD+ (B)		Pin_b RxD+			
		Pin 3 RxD+ (B)		Pin_c TxD+			
		Pin 4 RxD- (A)		Pin_d TxD-			
		Pin 5 GND		Pin_e GND			
		Pin 6 not used					
		Pin 7 not used					
		Pin 8 not used					
		Pin 9 not used					
W-U010b	Computer (serial card slot D)	Port 2 / 9-pin D-sub M (identical to W-U010a)	Attitude sensors/ telegram output/ external interface		Serial line/split cable 3x2x0.5 w/screen	RS-422	2.5.4 D-sub plug for RS- 232/RS422
W-U010c		Port 3 / 9-pin D-sub M (identical to W-U010a)			Serial line/split cable 3x2x0.5 w/screen		
W-U010d		Port 4 / 9-pin D-sub M (identical to W-U010a)			Serial line/split cable 3x2x0.5 w/screen		
W-U011a		Computer		NET A	Network A		
W-U011b	Computer	NET B	Network B	RJ45 – B – Port			
W-U012	Computer	Transceiver	Ethernet switch	G1, RJ45			

1.3 Ethernet switch/Converter

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U021a	From vessel distribution	Vessel UPS/Fuse: F	Moxa power	TB	Power	115/230 VAC	
		L		L			
		N		N			
		GND		GND			
W-U021b	From Moxa power	TB	Ethernet switch	PWR1	Power	12-45 VDC	
		+V		V1+			
		-V		V1-			

1.4 HAIN with HSC 1-ix computer interface to Seatex JB7 with MGC (IMU)

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-H001	Display (optional)	DP/DVI/HDMI	Computer	USB-C /DP/MiniDP	Special w/converter	VIDEO	
W-H002	Keyboard (optional)		Computer	USB	Special included	USB interface	
W-H003	Mouse (optional)		Computer	USB	Special included	USB interface	
W-H006a	Mains socket (optional)	Vessel UPS/Fuse: F	Display	IEC	Power	115/230 VAC	2.5.3 Power cables
W-H006b	Mains socket	Vessel UPS/Fuse: F	Computer	IEC			
W-H007	EMC Ground	Screw terminal	Computer		EMC optional cable	EMC ground	
W-H011a	Computer	NET A	Network A	RJ45 – A – Port	Cat6/Cat7*	Ethernet	2.5.2 Ethernet cables
W-H011b	Computer	NET B	Network B	RJ45 – B – Port			
W-H012	Computer	IMU/JB7	JB7	RJ45-Data3 (LAN3)	Cat6/Cat7*	Ethernet	
W-H013	JB7	JB11a/JB11b	IMU	Cable	Special included	Signal	For Cable details see section 3.4

1.5 Responder Driver Unit (RDU)

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U020	Responder Driver Unit Alternative 1	Ethernet, RJ45	Ethernet switch	Ethernet, RJ45	Cat6/Cat7*	Ethernet	2.5.2 Ethernet cables
W-U045	Responder Driver Unit Alternative 2	Ethernet, RJ45	HiPAP TU x82 Responder Driver Unit	Ethernet, RJ45	Cat6/Cat7*	Ethernet	
W-U021c	Mains socket		Responder Driver Unit	Power 115/230 VAC	Power	115/230 VAC	2.5.3 Power cables
W-U022	Responder 1 Electrical output	9-pin male D-sub	Responder 1 Electrical drive signal	Transponder Responder Trig input	Responder Trigger		
		Pin 1 Power 1 +24V				Power	
		Pin 2 Drive signal 1				0-24 V pulse	
		Pin 3 GND				GND	
W-U023	Responder 2 Electrical output	9-pin male D-sub	Responder 2 Electrical drive signal	Transponder Responder Trig input	Responder Trigger		
		Pin 6 Power 2 +24V				Power	
		Pin 7 Drive signal 2				0-24 V pulse	
		Pin 8 GND				GND	
W-U024	Responder 3 Electrical output	9-pin male D-sub (identical to W-U022)	Responder 3 Electrical drive signal	Transponder Responder Trig	Responder Trigger	Identical to W-U022	
W-U025	Responder 4 Electrical output	9-pin male D-sub (identical to W-U023)	Responder 4 Electrical drive signal	Transponder Responder Trig	Responder Trigger	Identical to W-U023	
W-U026	Responder 5 Fibre optic output	ST	Responder 5 Optical drive signal	ST	Fibre-optical cable	Fibre-optic	
W-U027	Responder 6 Fibre optic output	ST	Responder 6 Optical drive signal	ST	Fibre-optical cable	Fibre-optic	
W-U028	Responder 7 Fibre optic output	ST	Responder 7 Optical drive signal	ST	Fibre-optical cable	Fibre-optic	
W-U029	Responder 8 Fibre optic output	ST	Responder 8 Optical drive signal	ST	Fibre-optical cable	Fibre-optic	

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U030	Responder Driver Unit	Input Responder sync 9-pin male D-sub	HiPAP Transceiver x82	TB-X2	1x2x0.75 / w/screen	Sync RS-422	See 3.1 Transceiver x82 wiring diagram.
		Pin 1 Sync+		13 Sync out+			
		Pin 2 Sync-		14 Sync out-			
				15 GND			

1.6 1PPS converter (option)

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U031a	From vessel distribution	Vessel UPS: Fuse: F	1PPS power	TB	Power	115/230 VAC	
		L		L			
		N		N			
		GND		GND			
W-U031b	From 1PPS power	TB	1PPS Converter	TB	Power	9-15 VDC	
		+V		1			
		0V (GND)		2			
W-U031c	From GPS		1PPS Converter	TB	Serial line	RS-232	
		Data output		3 Data Input			
		1PPS output		5 1PPS input (TTL)			
		Signal ground		6 Signal GND			

1.7 HiPAP Transceiver Unit x82 (TU)

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U040a	HiPAP TU x82	1000BaseTX port G1	Ethernet switch	Fibre splice box, Pair 1: con 1, 2	Fibre-optic cable	Multimode OM2 50/125 µm	Note! 2 fibre pairs required in cable if W-U040b is not used
		1000BaseTX port G4		Fibre splice box, Pair 2: con 3, 4			
W-U040b (option)	HiPAP TU x82	1000BaseTX port G4	Ethernet switch	Fibre splice box, Pair 2: con 3, 4	Fibre-optic cable	Multimode OM2 50/125 µm	
W-U041	HiPAP TU x82 Internal patch cable		Ethernet switch		Fibre-optic cable	Multimode OM2 50/125 µm	
W-U042a	Mains	Vessel UPS: Fuse: F	HiPAP TU x82	X3:1a, 2a, 3a	Power 3x1.5-2.5 mm ²	115/230 VAC	See 3.1 Transceiver x82 wiring diagram.
W-U042b	Mains (optional)	Vessel UPS: Fuse: F	HiPAP TU x82	X3:1b, 2b, 3b	Power 3x1.5-2.5 mm ²	115/230 VAC	
W-U043	EMC ground	Screw terminal	HiPAP TU x82	Screw terminal		EMC ground	
W-U044	HiPAP x82	TB-X2	External sync (Dual HiPAP option)	HiPAP x82 / TB-X2	External sync 2x2x0.75 with screen	Sync RS-422	See 3.1 Transceiver x82 wiring diagram.
		11 Sync in+		13 Sync out+			
		12 Sync in-		14 Sync out-			
		13 Sync out+		11 Sync in+			
		14 Sync out-		12 Sync in-			
		15 GND		15 GND			
		16 Screen		16 Screen			
W-U046	HiPAP TU x82		Hull unit junction box	Special connector	Special cable	Analogue signals	KD Supply

*Cat 6 for patch and Cat 7 for installation.

1.8 HiPAP Hull unit with Hull Unit Controller (HUC) and hydraulic Gate Valve (GV)

KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U060	Mains		HUC	F1	Power 4x1.5	AC power, 3-phase, 440/380/230 VAC	
		R		6			
		S		4			
		T		2			
		GND		PE/Cabinet			
W-U061	HUC	U5	Hull Unit Hoist motor Junction box	TB	Power 4x1.5	AC power, 3-phase, 440/380/230 VAC	
		2		U1			
		4		V1			
		6		W1			
		PE/Cabinet		Ground			
W-U062	HUC	U2 MEI	Hull Unit Limit Switch Junction box	TB	Signal 6x0.75	Control Hull unit upper position Hull unit lower position	
		171 HU UP (NO)		5			
		172 HU UP (NO)		6			
		181 HU LO (NO)		1			
		182 HU LO (NO)		2			
W-U065	HUC		Ground			EMC Ground	
W-U066	Top of transducer	Special connector	TD junction box	Special connector	Special cable	Analogue	KD Supply
W-U070	HUC	U7	Motor power pack		Power 4x1.5	AC power, 3-phase, 440VAC/5.5 kW	Not used for Manually operated Gate Valve
		4		U1			
		5		V1			
		6		W1			
		Ground		Ground			
W-U071	HUC	K8/F3	Solenoid coil open		Signal 2x0.75	Control +24V 0V	Not used for Manually operated Gate Valve
		K8 14		+Open			
		F3 4		-Open			

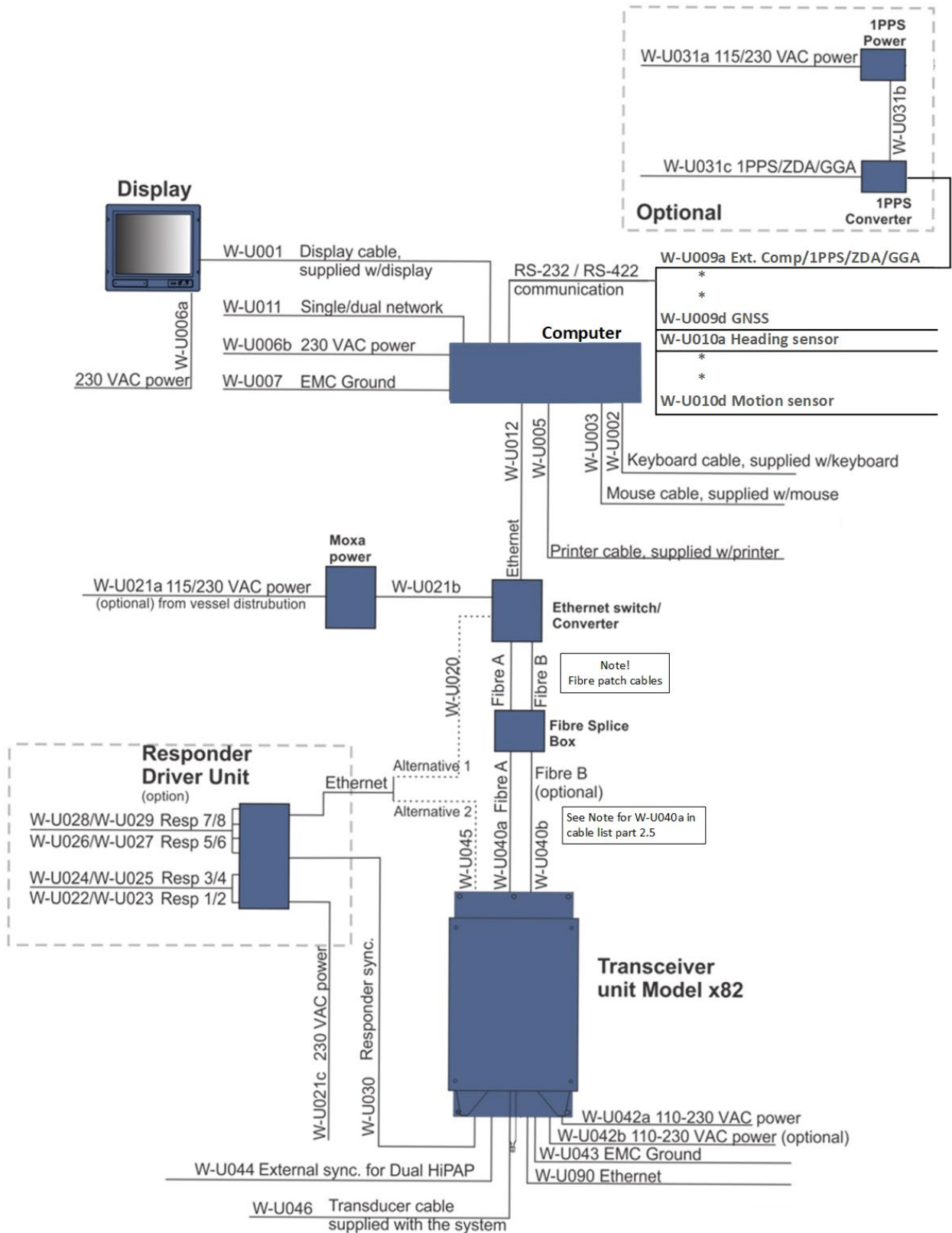
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KD Cable Core no	Cable from/Connection	Term/Plug pin no	Cable to/Connection type	Term/Plug pin no	Cable type/spec. signal	Signal type	Ref. plug layout
W-U072	HUC	HUC K9	Solenoid coil closed		Signal 2x0.75	Control	Not used for Manually operated Gate Valve
		K9 14		+Close		+24V	
		F3 4		-Close		0V	
W-U073	GV Limit Junction box	TB	GV open limit sensor	Wire	Sensor cable, 2meter		See Limit Sensor schematics in section 3.6
		1		Brown			
		2		Blue			
W-U074	GV Limit Junction box	TB	GV closed limit sensor	Wire	Sensor cable, 2meter		See Limit Sensor schematics in section 3.6
		4		Brown			
		5		Blue			
W-U075	HUC	U2/F3	GV Limit Junction box	TB	Signal 6x0.75		See HUC to HU and GV Interface Connection in section 3.2
		F3 +24V		1			
		F3 0V		2			
W-U080	LASER at the hull unit (option)	Cable (included)	HUC	U2/F3	Special sensor cable. 10m	Control	Ref. drawing in section3.4
		Brown		F3 +24V		V+	
		Blue		F3 0V		V-	
W-U080	LASER at the hull unit (option)	White	HUC	U2 332	Special sensor cable. 10m	4-20ma (+)	Ref. drawing in section3.4
		Blue		U2 333		4-20ma (-)	
		Black		Not used			
W-U090	X.82/Ethernet switch	Ethernet, RJ45	HUC	Ethernet, RJ45	Cat 7*	Ethernet	

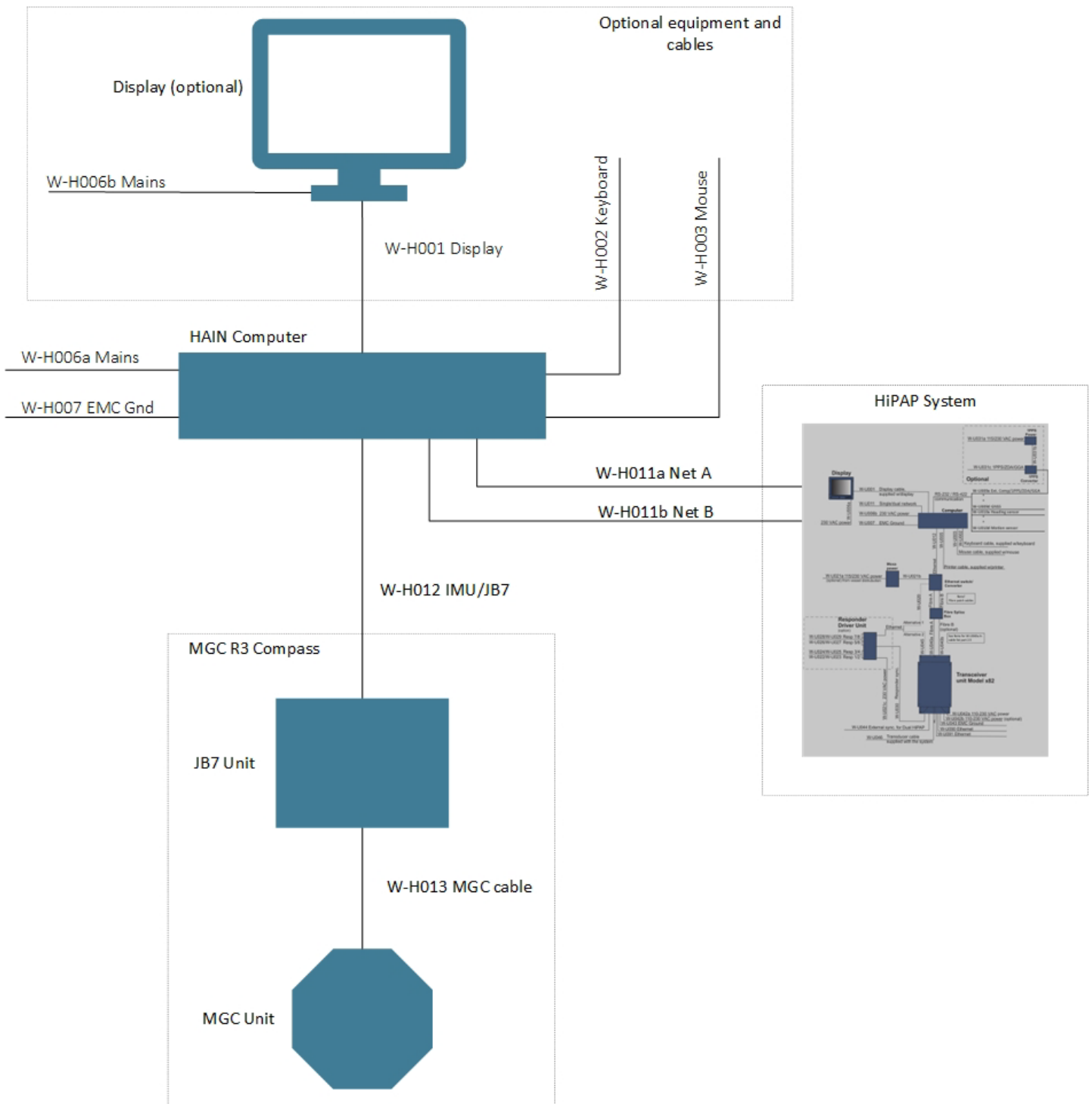
*Cat 6 for patch and Cat 7 for installation.

2 CABLE OVERVIEW

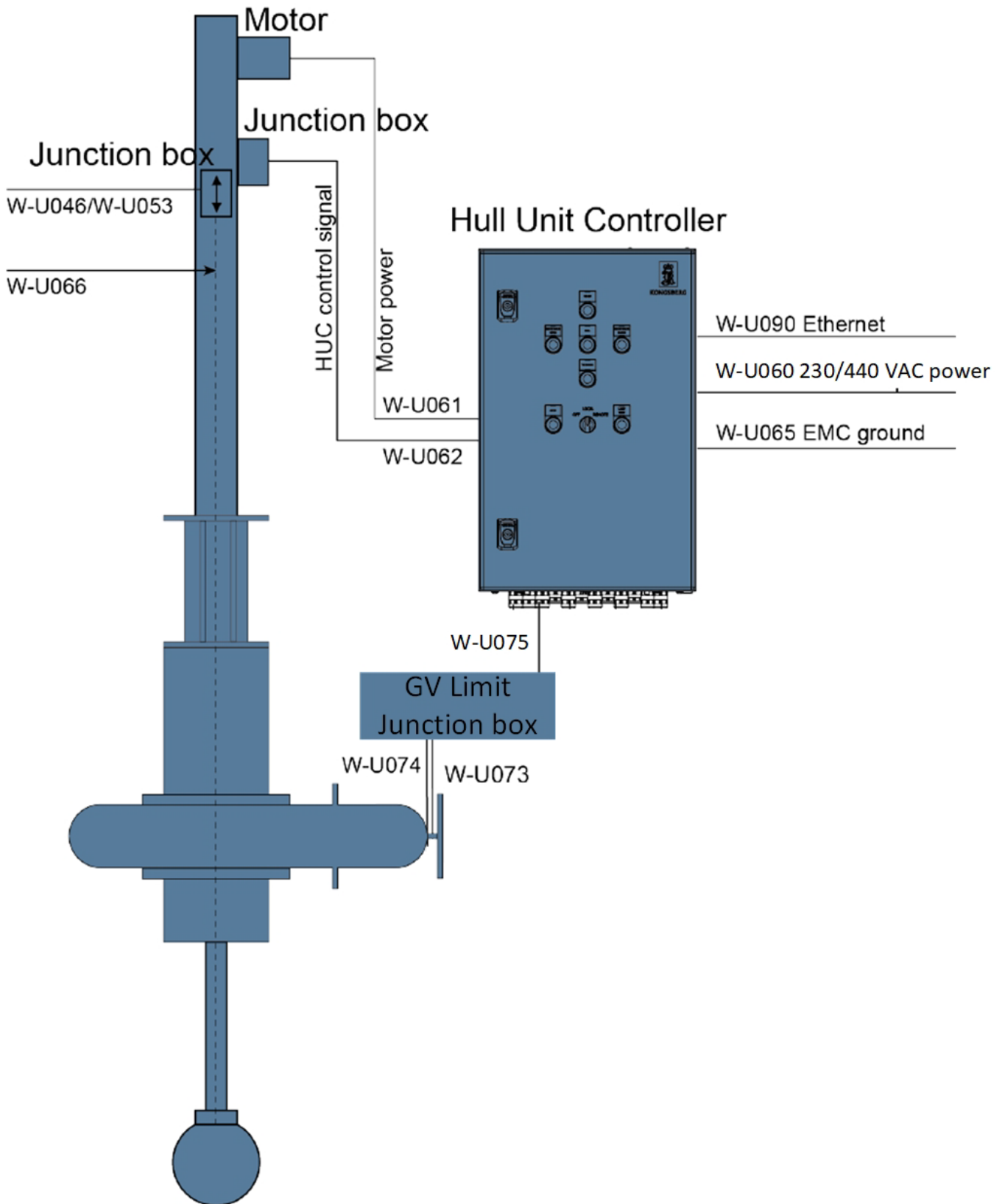
2.1 HiPAP system with transceiver x82 (TU)



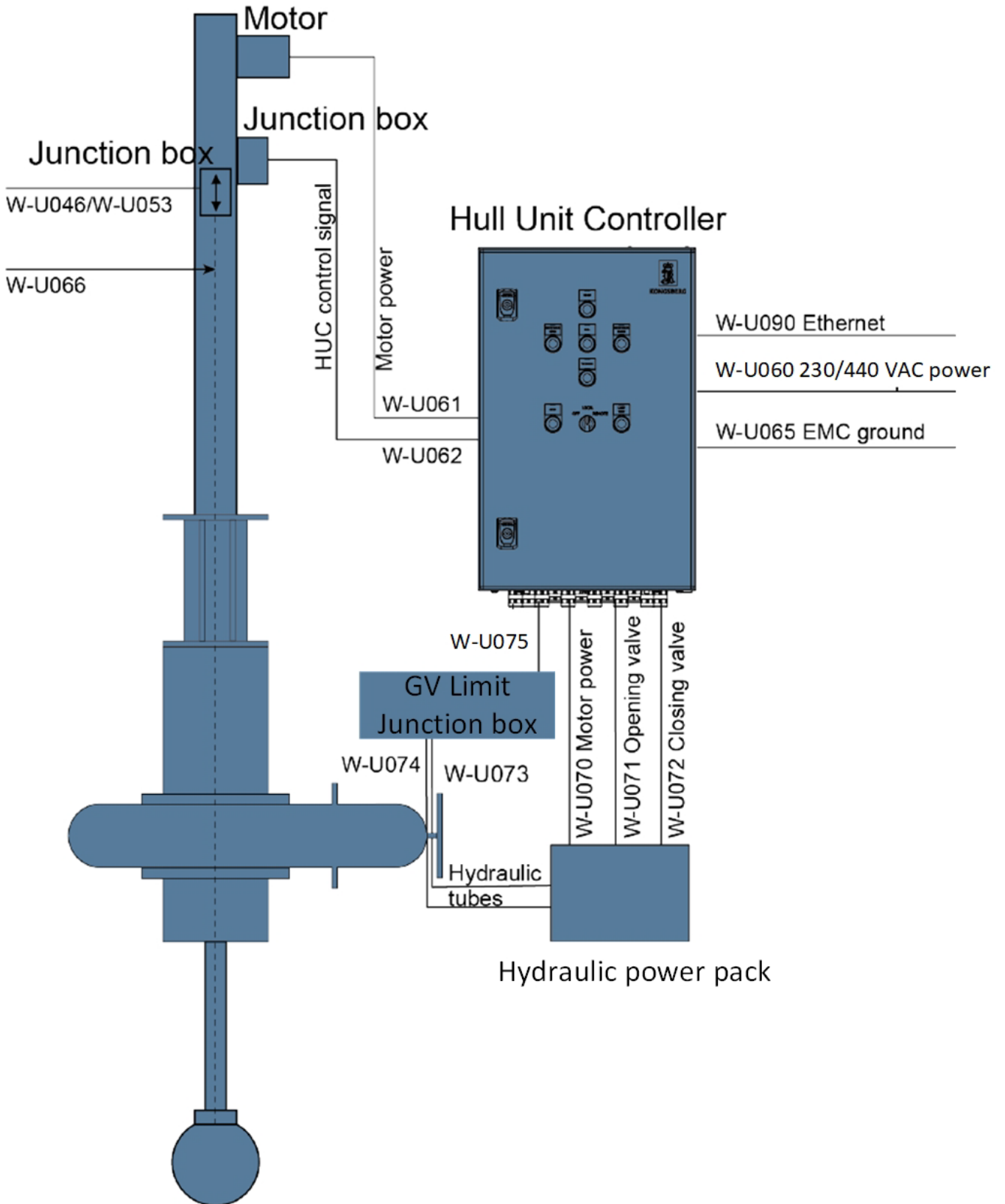
2.2 HAIN system with Seatex JB7 and MGC (IMU)



2.3 HiPAP hull unit system with HUC and manual gate valve

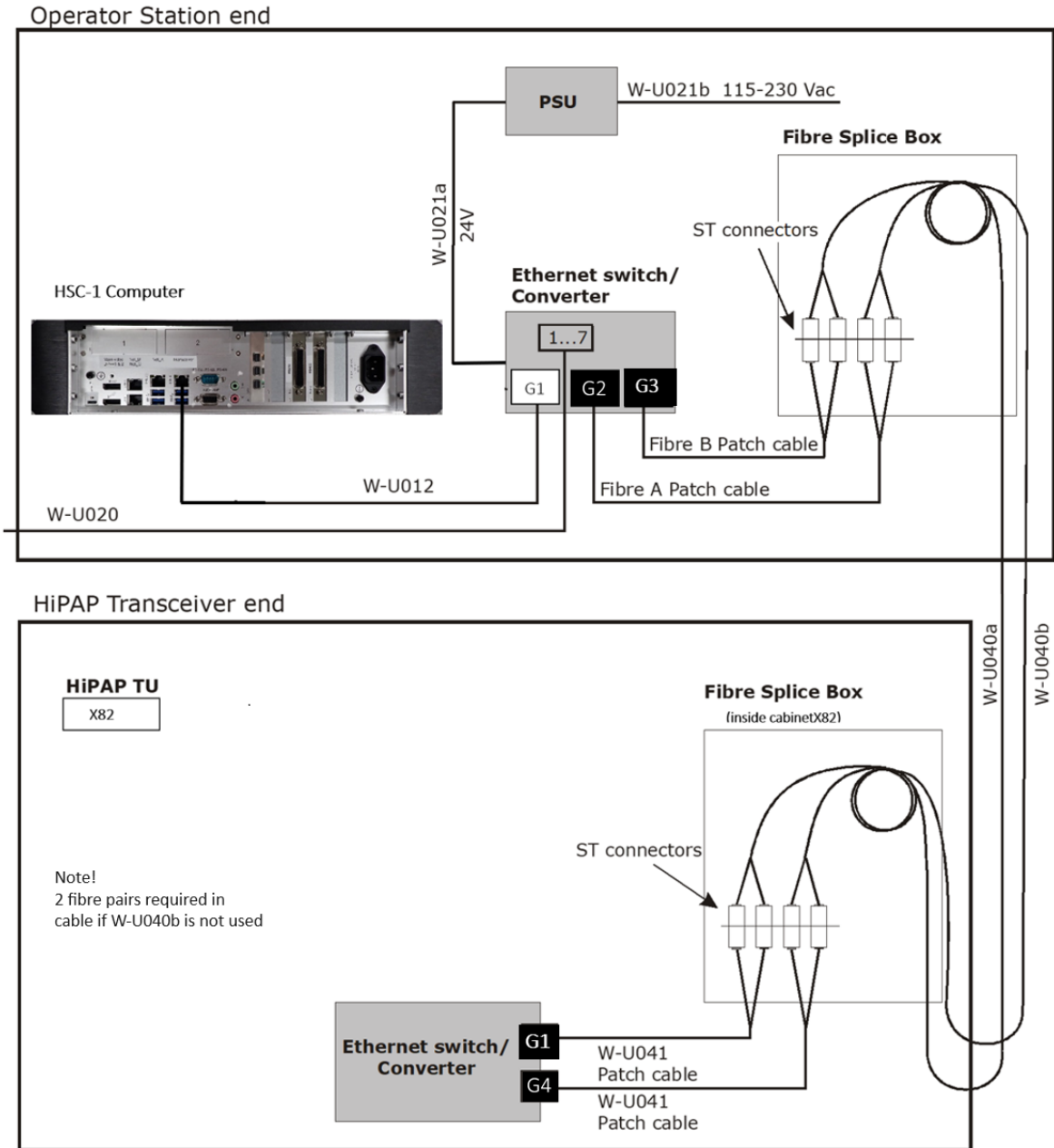


2.4 HiPAP hull unit system with HUC and hydraulic gate valve



2.5 Cables

2.5.1 Fibre-optic cables



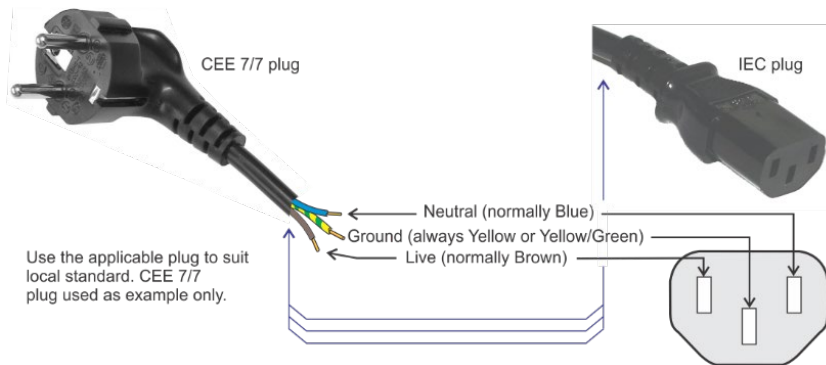
Fibre-optic cable- ST

2.5.2 Ethernet cables



Wire Diagram for T568B (Straight Through Cable)				
RJ45 Pin #	Wire Color (T568A)	Wire Diagram (T568A)	10Base-T Signal 100Base-TX Signal	1000Base-T Signal
1	White/Orange		Transmit+	BI_DA+
2	Orange		Transmit-	BI_DA-
3	White/Green		Receive+	BI_DB+
4	Blue		Unused	BI_DC+
5	White/Blue		Unused	BI_DC-
6	Green		Receive-	BI_DB-
7	White/Brown		Unused	BI_DD+
8	Brown		Unused	BI_DD-

RJ45 plug for Ethernet cables

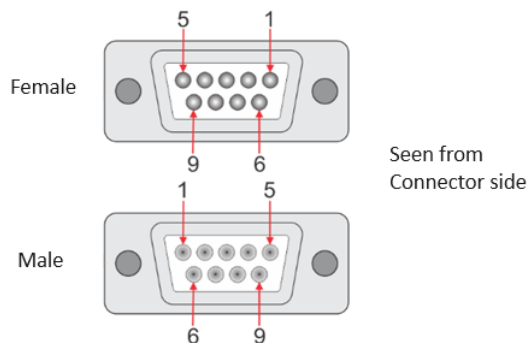
2.5.3 Power cables



Standard plug for AC power cables.

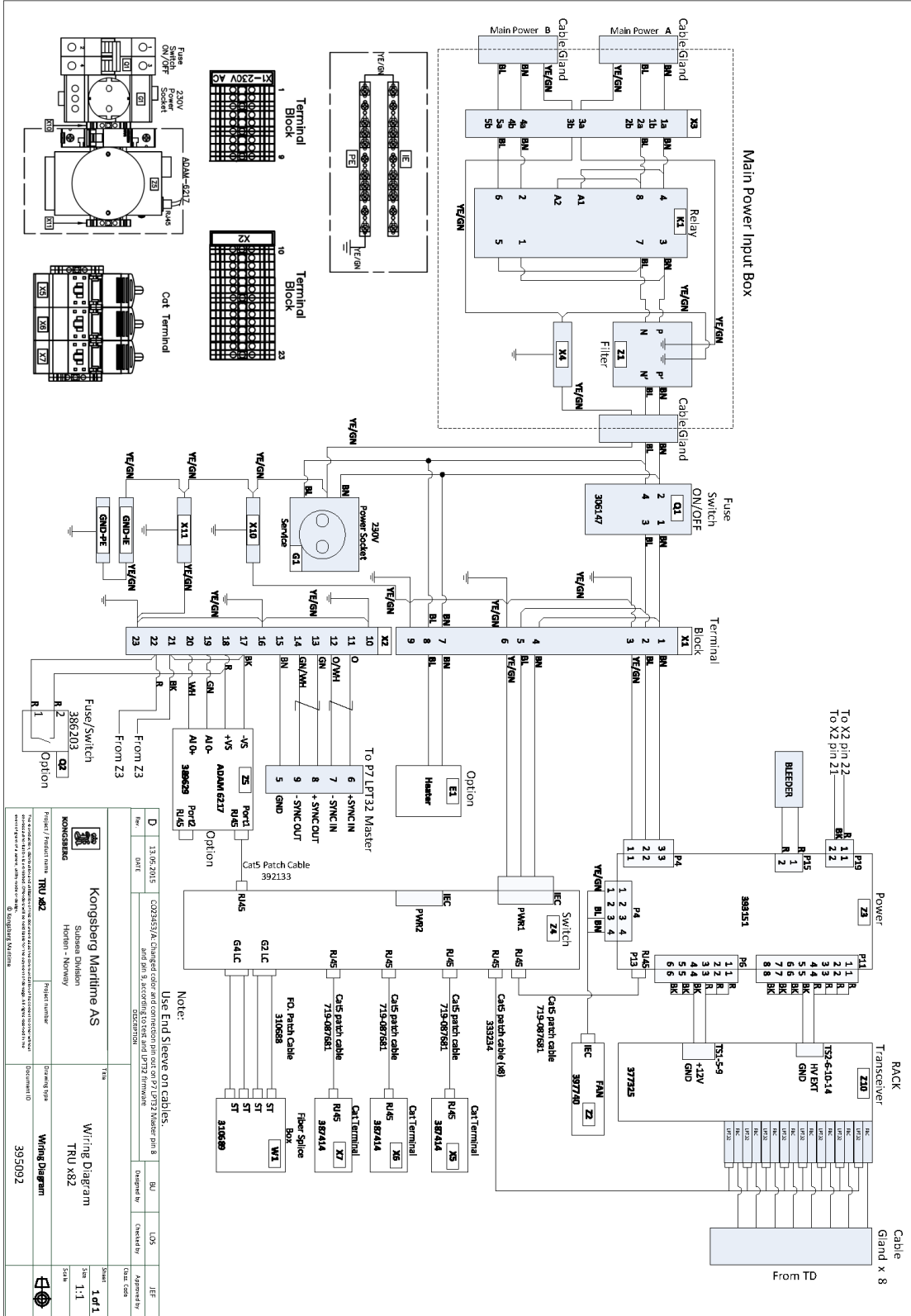
 <p>Würth 742 712 21 (1212004518-01) (split, 10.5mm)</p>	<p>1 x Würth 742 712 21</p> <p>This ferrite is required when using 100/110/115V AC voltage on the power supply (not required for 230V AC) to be fully compliant with type approvals.</p>	
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2.5.4 D-sub plug for RS-232/RS422

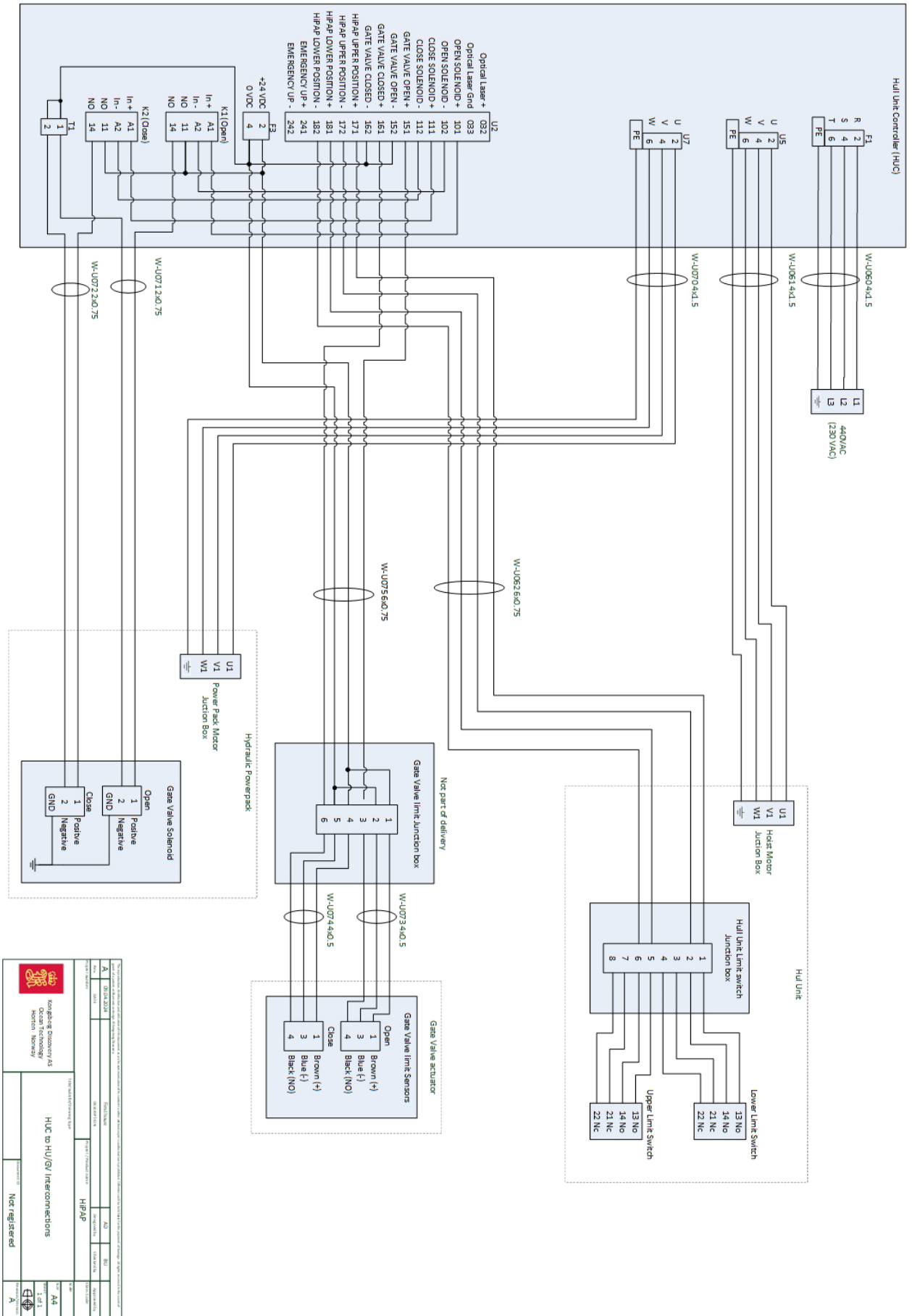


3 WIRING DIAGRAMS

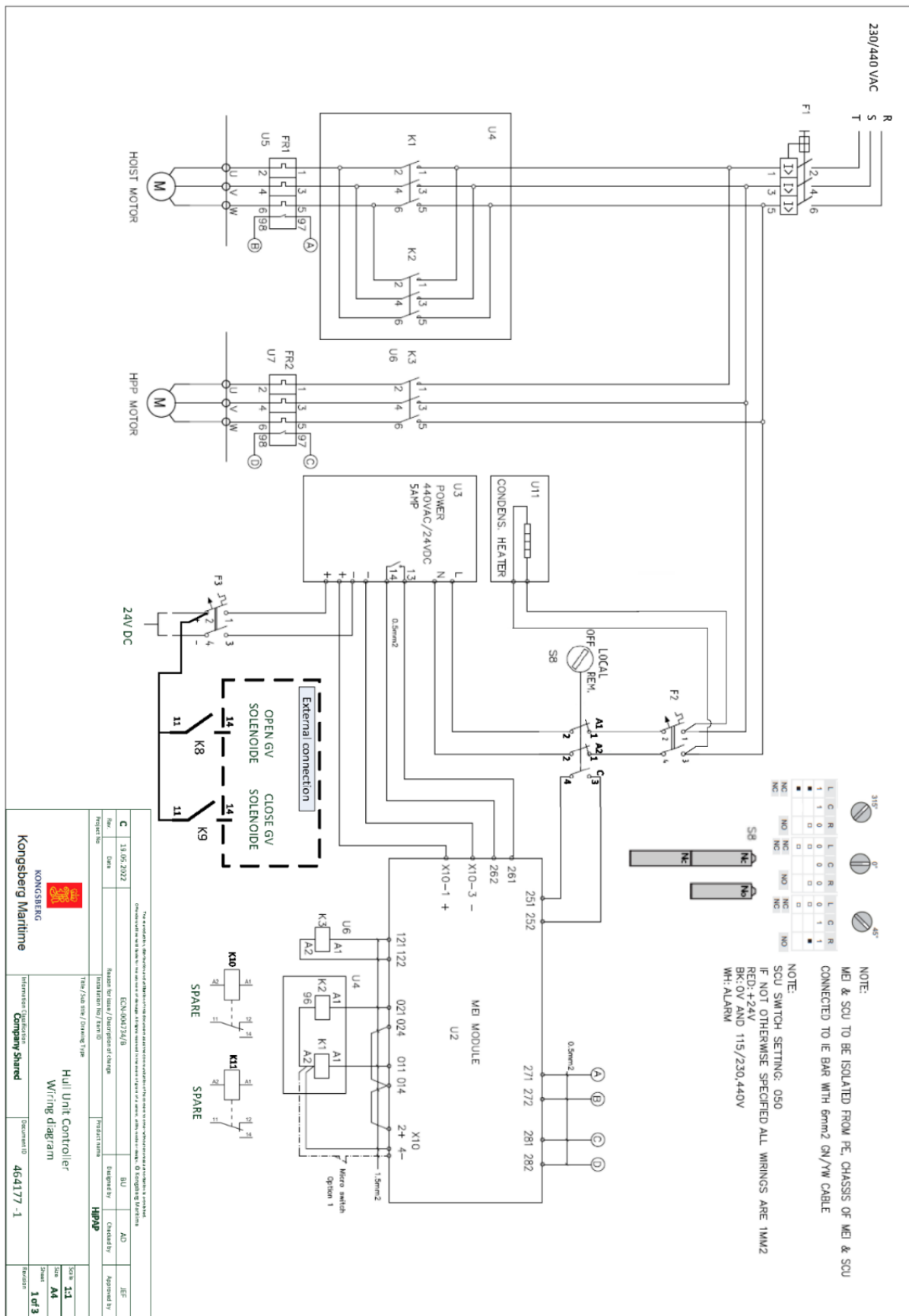
3.1 Transceiver x82 wiring diagram.

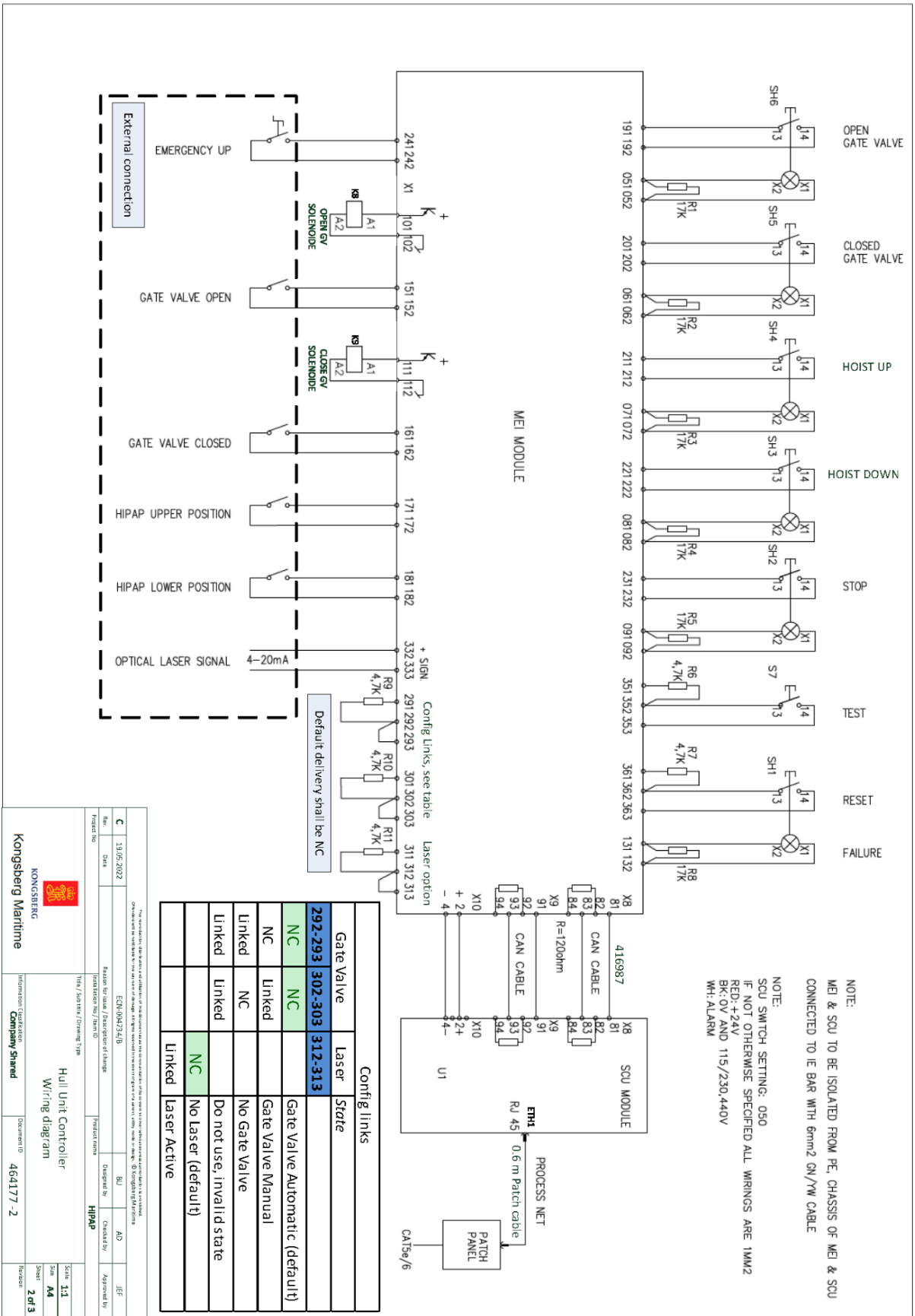



3.2 HUC to HU and GV Interface Connection



3.3 Hull Unit Controller wiring diagram.







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 Information Classification: **Company Secret**
 Document ID: 464177 -2

Title / Subject / Drawing Type: **Hull Unit Controller Wiring diagram**
 Project Name: **HIPAP**
 Scale: **A4**
 Sheet: **2 of 3**

Date: 13/05/2022
 Author: EOH/KM/348
 Checked by: AD
 Approved by: JEF

Wiring Diagram		
Drawing	POS	Description
F1	009	Fuse 1
F2	010	Fuse 2
F3	011	Fuse 3
SH1	072/073	FAIL (red)
SH2	072/073	STOP (red)
SH3	076/077	HOIST DOWN (yellow)
SH4	070/071	HOIST UP (green)
SH5	076/077	GATE VALVE CLOSE (yellow)
SH6	070/071	GATE VALVE OPEN (green)
SH7	074/075	TEST (white)
S8	078/079	3-way switch
U1	002	SCU
U2	003	MEI
U3	004	Power DC 24V
U4	005	K1/K2 Hoist
U5	008	FR1 Hoist Relay
U6	006	K3 HPP
U7	007	FR2 HPP
U8	012	Patch Panel
U9	018	Earth
U10	018	Earth
U11	013	Condens heater
K8	015	Relay
K9	015	Relay
K10/K11	015	Relay Spare

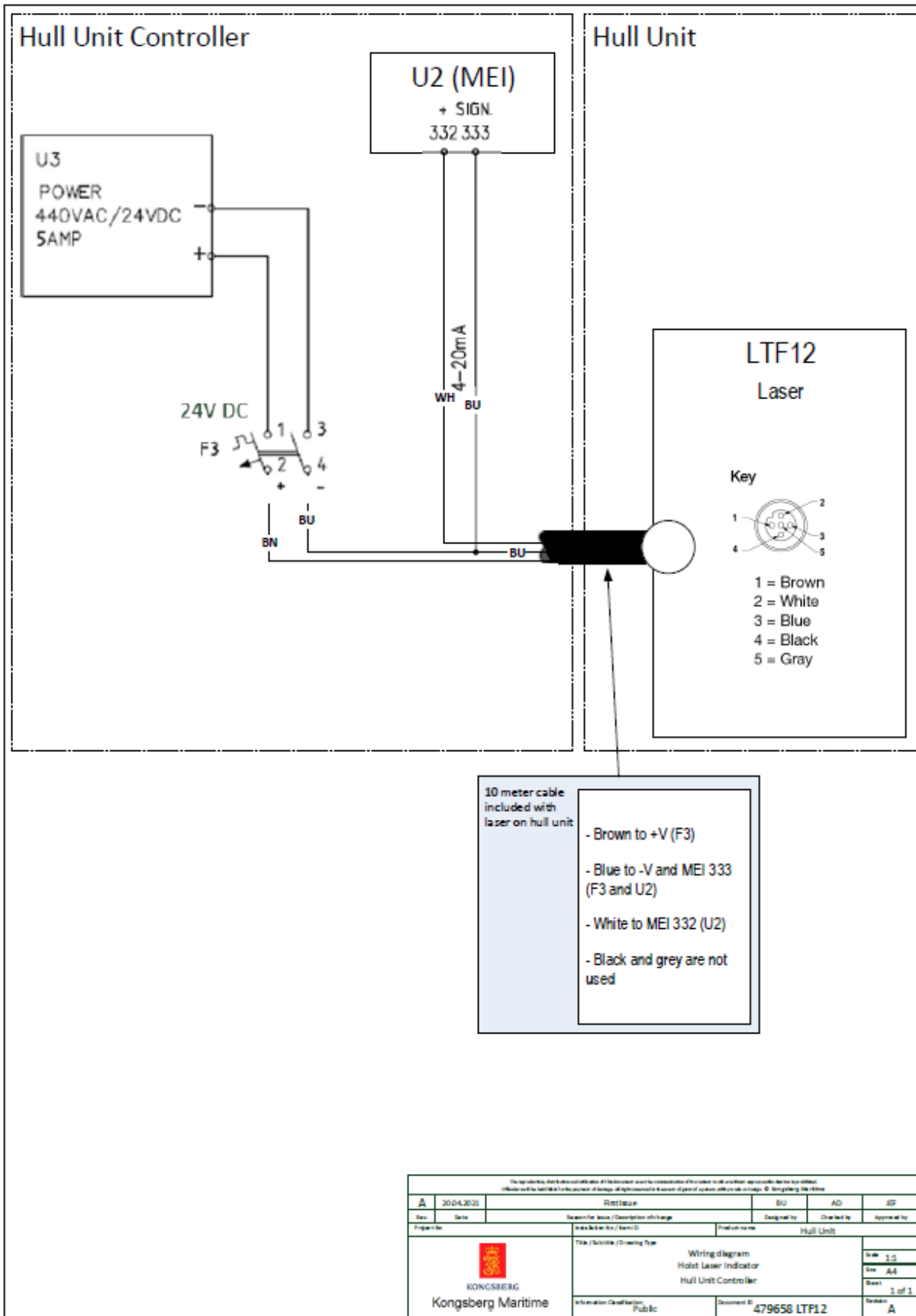
 KONGSBERG Kongsberg Maritime		ECH-006734/B Report for name / description of change Instrument ID / Item ID		BU Request by AD Checked by Approved by	
Date 19.05.2022	Project No C	Instrument ID / Item ID ECH-006734/B	Product name HPP	Document ID 464177 - 3	Revision 3 of 3
Title / Subtitle / Drawing Type Hull Unit Controller Assembly info diagram			Information Classification Company Shared		

3.4 JB7 MGC cable details

J11A	Signal		Pair no.	Colour
1	MTX1_A-	RS-422A- output data from MGC	2b	Orange
2	MTX1_B+	RS-422B+ output data from MGC	2a	White
3	MRX1_A-	RS-422A- input data to MGC	3b	Green
4	MRX1_B+	RS-422B+ input data to MGC	3a	White
5	MRX2_A-	RS-232 data to MGC	7a	Red
6	MRX2_B+		14a	Black
7	MTX2_A-	RS-232 data from MGC	7b	Orange
8	MTX2_B+		14b	Brown
9	MRX3_A-	RS-422A- or RS-232 input to MGC	8a	Red
10	MRX3_B+	RS-422B+ or RS-232 return to MGC	8b	Green
11	MRX4_A-	RS-422A- or RS-232 input to MGC	9a	Red
12	MRX4_B+	RS-422B+ or RS-232 return to MGC	9b	Brown
13	DISP0	Internal control	12a	Black
14	DISP1	Internal control	12b	Orange

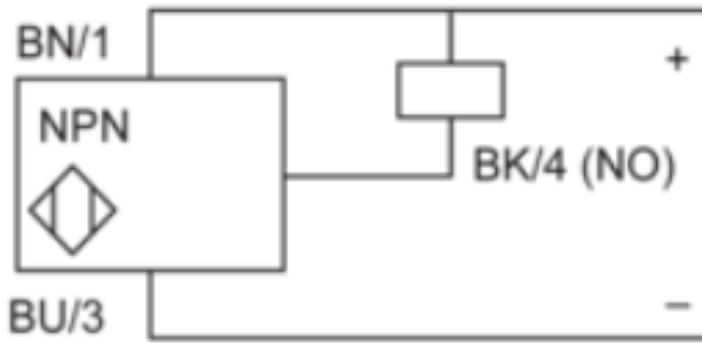
J11B	Signal		Pair no.	Colour
15	PWR-	Power supply (0 V)	1b	Blue
16	PWR+	Power supply (+24 V)	1a	White
17	RJ-1	TD+, Ethernet	4a	White
18	RJ-2	TD-, Ethernet	4b	Brown
19	RJ-3	RD+, Ethernet	6a	Red
20	RJ-6	RD-, Ethernet	6b	Blue
21	Alert	MGC alert	5a	White
22	GND	MGC ground	5b	Grey
23	XIN	Signal to MGC	10b	Grey
24	CGND	Communication ground	10a	Red
25	EOUT	Signal from MGC, 5 Volt level	11b	Blue
26	XOUT	Signal from MGC, 5 Volt level	11a	Black
27	DISP2	Internal control	13a	Black
28	VDD	5 Volt out, max. 20 mA	13b	Green

3.5 Hoist laser indicator HUC – wiring diagram for laser LTF12



3.6 Gate Valve limit sensors – wiring diagram inductive proximity sensor

Wiring Schemes



NPN
BU : Blue
BN : Brown
BK : Black

Manufacturer	Telemecanique
Model	XS612B4NAL2
Output signal	Discrete NPN NO
Rated supply voltage	12...48 VDC
Degree of protection	IP68
Operating zone	0...5,6 mm
Cable composition	3 x 0,34 mm ²
Cable length	2 m