

POS	QTY	NOMENCLATURE	PART NO.
1	3	SPLIT BUSHING	20104212
2	3	SET SCREW M4x10 A2	44150779
3	2	CONTROL KNOB	20104204
4	1	CONTROL KNOB C.S.	20104196
5	1	C-RING	44149508
6	1	WASHER, PLASTIC	44149219
7	1	FRONT CABINET	20176517
8	1	DISPLAY LCD	44116754
9	1	COURSE SELECTOR WHEEL	20104253
10	1	LIGHT DIFFUSER	20104188
11	2	LED HLMP0504	44118097
12	1	PC BOARD	20176533
13	1	GASKET	44190114
14	1	BACK CABINET	20104147
15	4	SCREW M4x12	44148898
16	1	GASKET	20104246
17	1	SWITCH V1 4POS	20176558
18	1	SWITCH V2 12POS	20104055
19	3	SEALING RING	20104980
20	2	T1/T2 2N6388	44103091
21	1	IC LM340T5	44116788
22	1	DISPLAY SCREEN	20105953
23	3	CONNECTOR 12PIN	20105995
24	1	WASHER	20105771

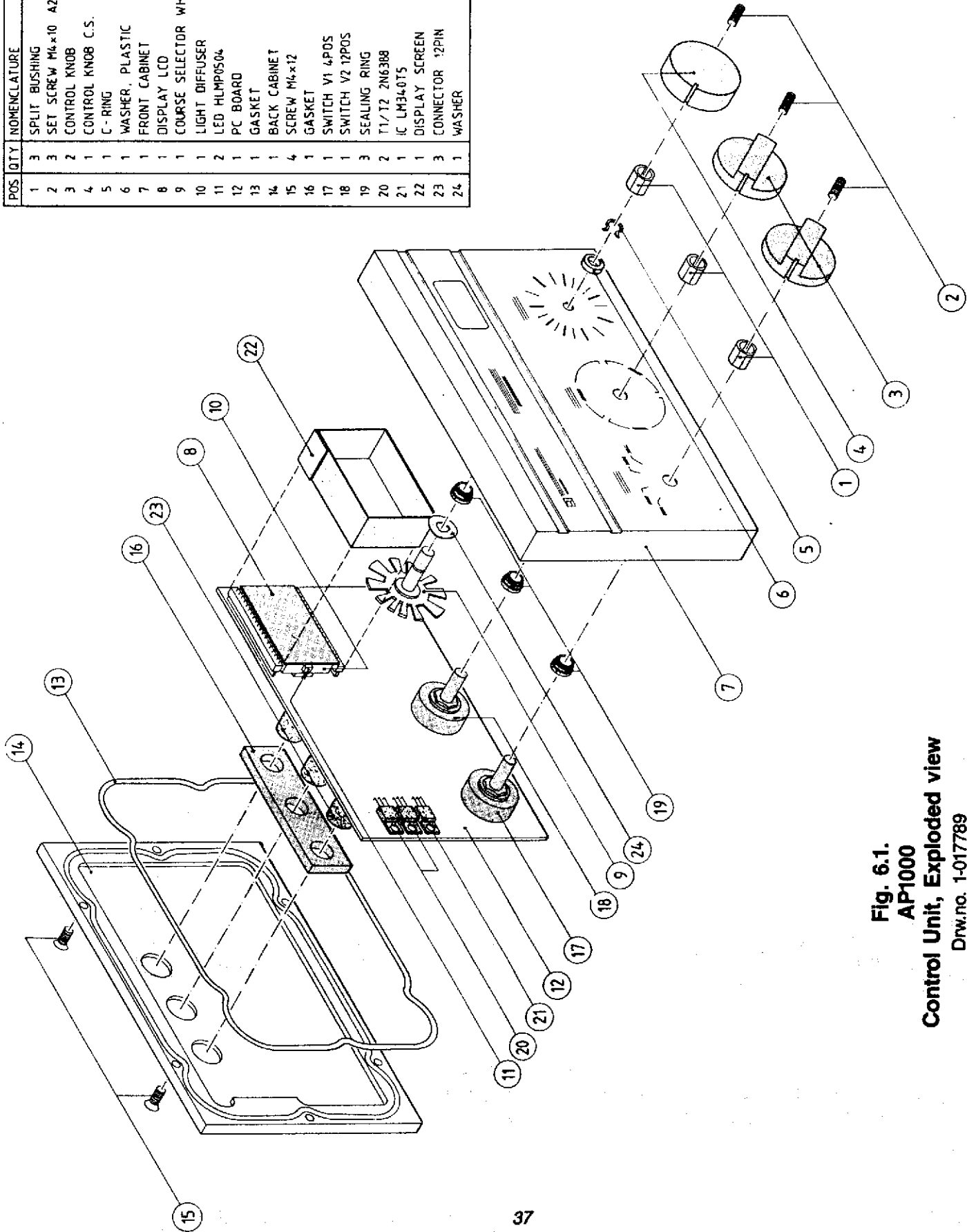


Fig. 6.1.
AP1000
Control Unit, Exploded view
Drw.no. 1-017789

4.2.14. Debug mode

If the stbd. push button on a remote control is pressed during switch on (or the S100 Steering Lever is operated) the digital readout can be used for reading of internal data. This mode should be avoided and used only for service and installation.

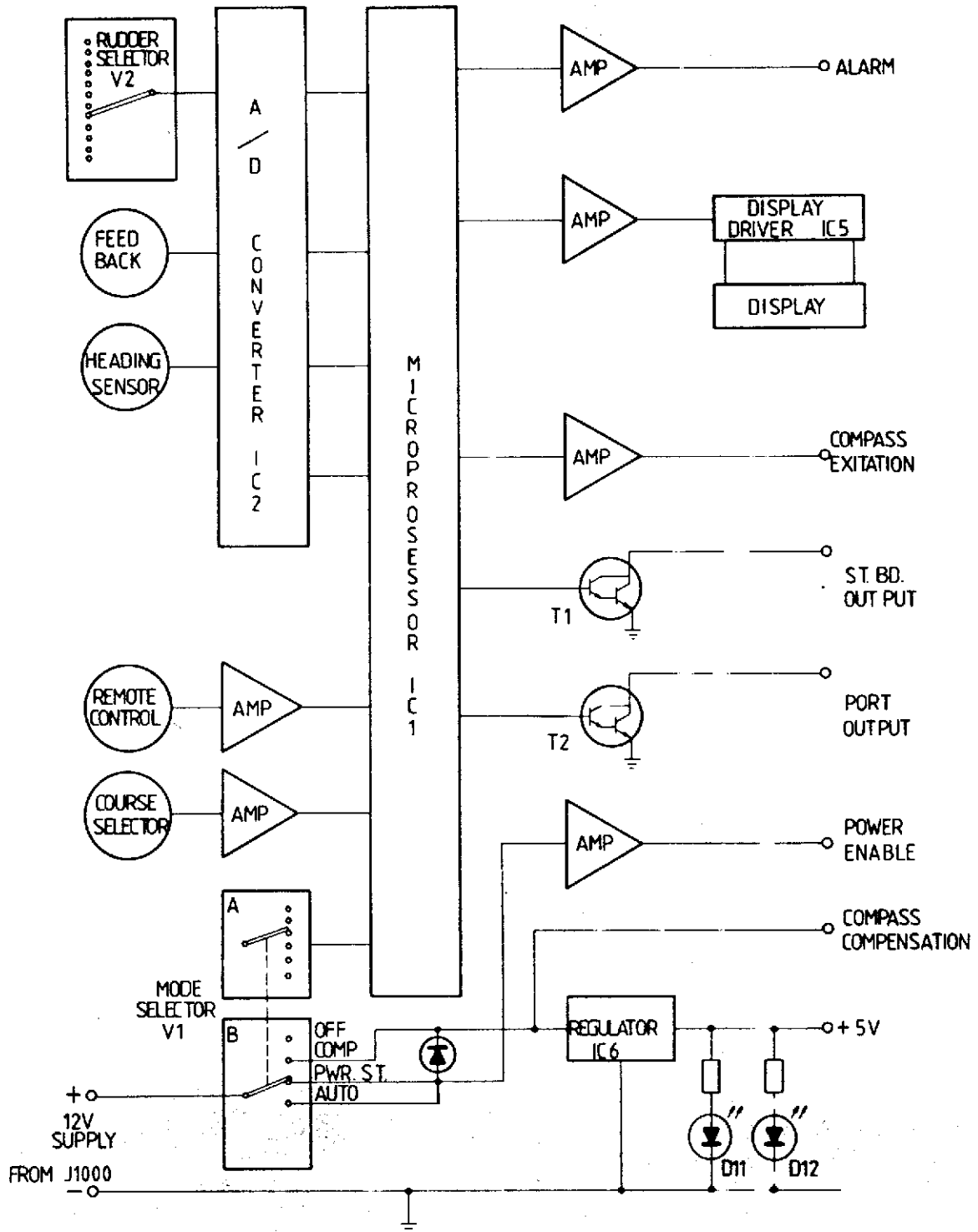


Fig. 4.1.
AP1000

Block Diagram/Blokkskjema

Drw.no. 3-017790

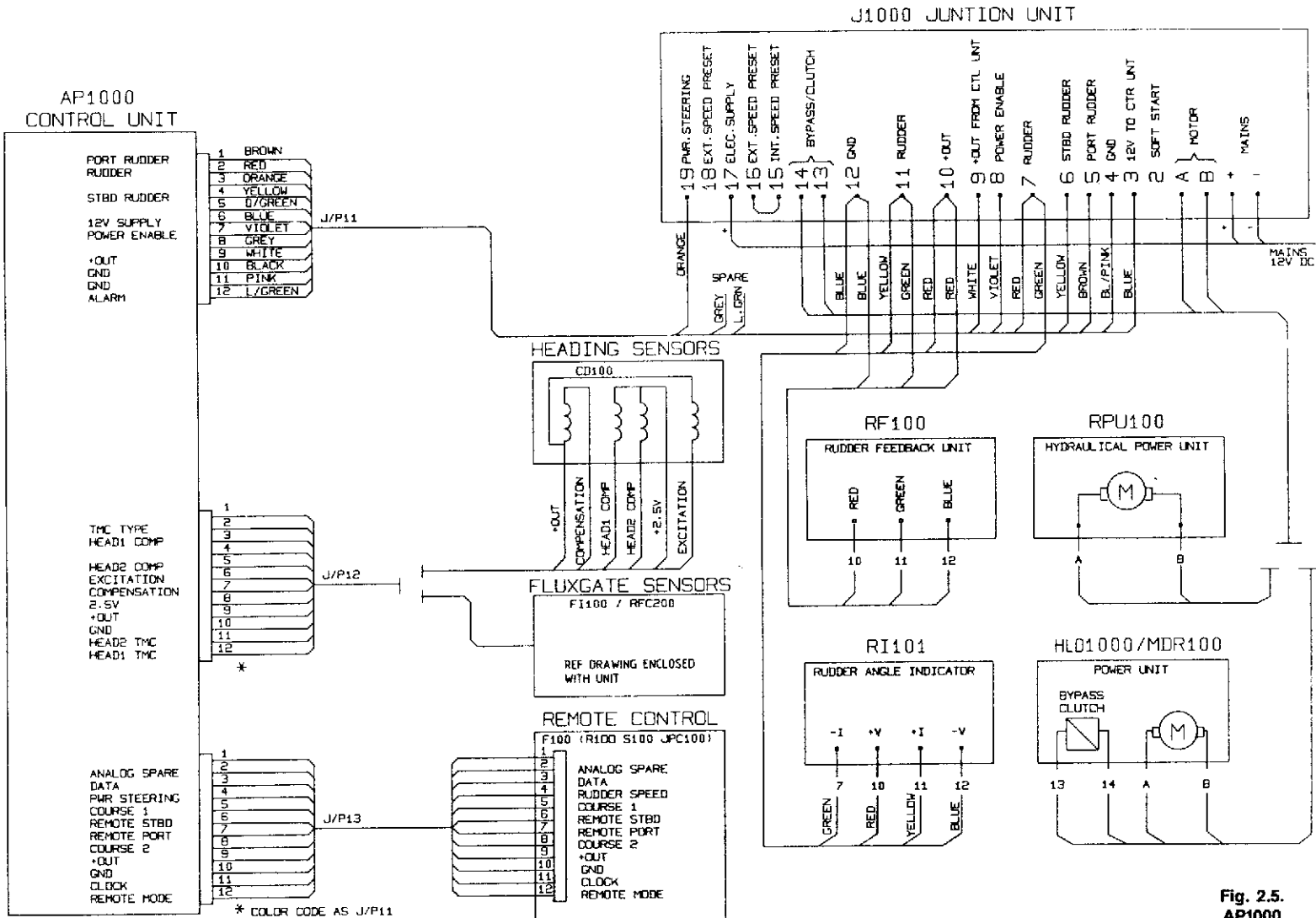


Fig. 2.5.
AP1000
Wiring Diagram
Dnw.no. 2-017792

SPARE PART LIST/RESERVEDELSLISTE

AP1000

PART NO.		
20176509	AP1000 Control Unit	AP1000 Kontrollenhet
20104220	Control knob assembly («COURSE»)	Kursvelgerknapp
20104238	Control knob assembly («RUDDER»/«MODE»)	Ror/Funksjonsvelgerknapp
44190114	Gasket O-ring 3 mm	Pakning O-ring 3 mm
20104253	Toothed wheel with shaft («COURSE»)	Tannhjul med aksling (kursvelger)
20105763	PC. board assembly	Printkort (komplett)
44116754	LCD display 4-digit	LCD-display 4 siffer
20104048	Control switch V1 5 x 2 pos. («MODE»)	Bryter V1 5x2 pos. (Funksjonsvelger)
20104055	Control switch V2 12 x 1 pos. («RUDDER»)	Bryter V2 12x1 pos. (Rorvelger)
44116788	Voltage regulator IC 6 LM 340 T5	Spenningsregulator
44103091	Transistor T1 - T2 2N6388	Transistor
44115160	Light emitting diode D11 - D12 SPR 5531	Lysdiode
44114841	Diode D13 1N6287A Transorbent 47 V	Zenerdiode
20104741	CD100 Course Detector Northern hemisphere	CD100 Kursdetektor Nordlig halvkule
20104758	CD100 Course Detector Southern hemisphere	CD100 Kursdetektor Sørlig halvkule
20104675	K12 Course sensor Northern hemisphere	K12 Kursdetektor Nordlig halvkule
20104782	K12 Course sensor Southern hemisphere	K12 Kursdetektor Sørlig halvkule
	Extension cables	Skjøtekabler
20105920	5 m (16,5 ft) cable with 2 plugs 7 pole	5 m kabel med 2 plugger, 7 pols
20105912	5 m (16,5 ft) cable with 2 plugs 12 pole	5 m kabel med 2 plugger, 12 pols
20105946	7 m (22,5 ft) cable with 2 plugs 12 pole	7 m kabel med 2 plugger, 12 pols

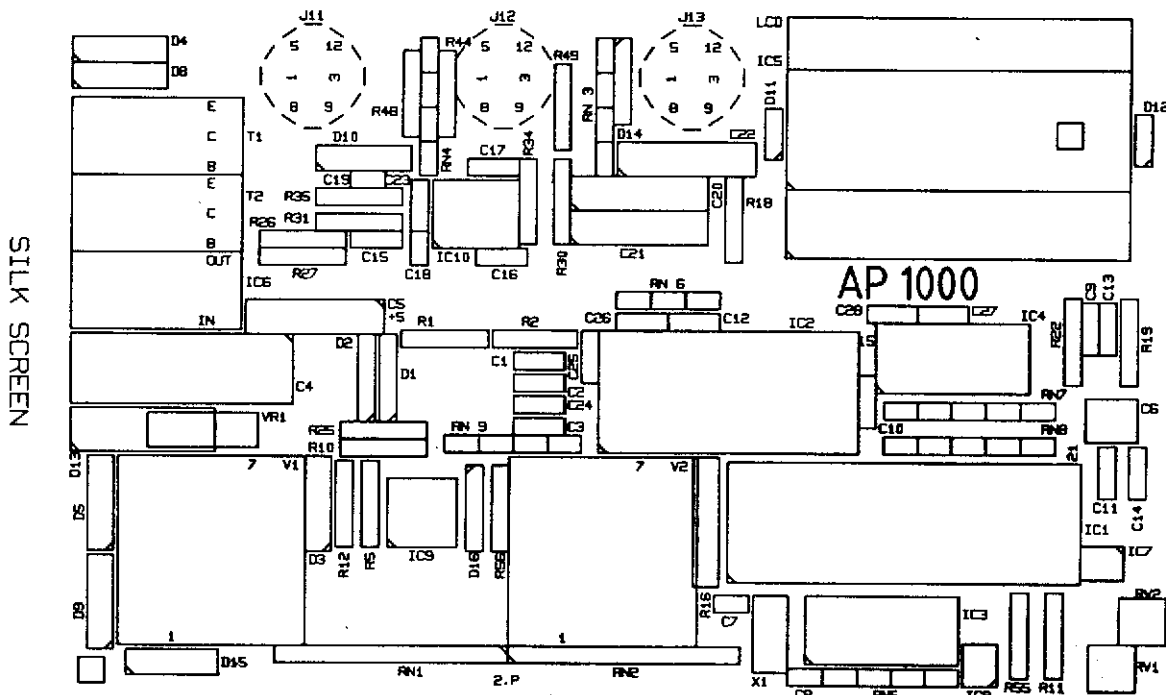
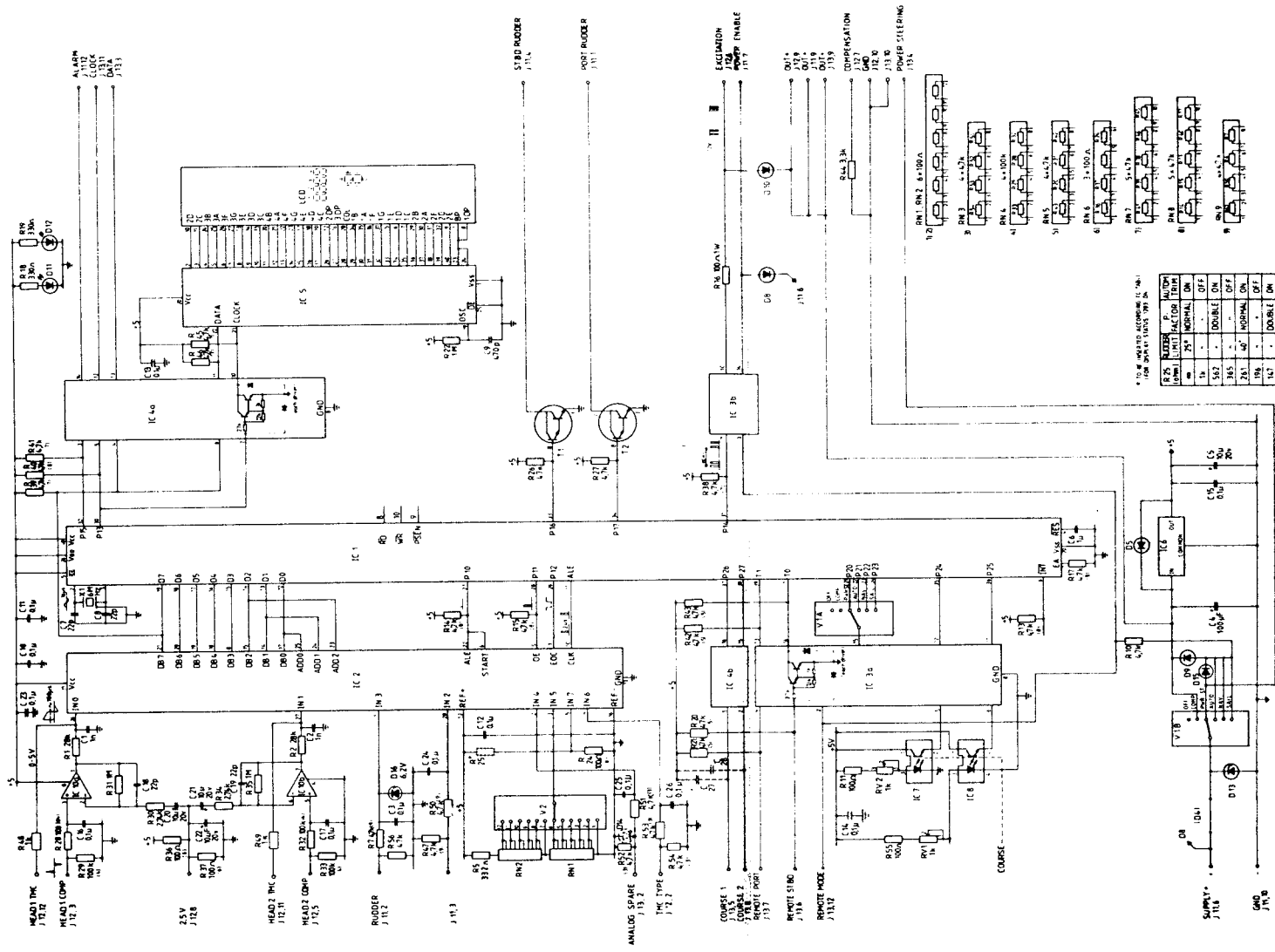


Fig. 6.2.
AP1000 Control Unit
Component reference
 Drw.no. 2-010575A



* TO BE ORDERED ACCORDING TO THE
FOR SUPPLY TABLE 100 50

R 25	RESISTOR	WATTAGE	UNIT	FACTOR	TOLERANCE
1	100Ω	1/4	Ω	10%	±10%
2	100Ω	1/4	Ω	10%	±10%
3	100Ω	1/4	Ω	10%	±10%
4	100Ω	1/4	Ω	10%	±10%
5	100Ω	1/4	Ω	10%	±10%
6	100Ω	1/4	Ω	10%	±10%
7	100Ω	1/4	Ω	10%	±10%
8	100Ω	1/4	Ω	10%	±10%
9	100Ω	1/4	Ω	10%	±10%
10	100Ω	1/4	Ω	10%	±10%
11	100Ω	1/4	Ω	10%	±10%
12	100Ω	1/4	Ω	10%	±10%
13	100Ω	1/4	Ω	10%	±10%
14	100Ω	1/4	Ω	10%	±10%
15	100Ω	1/4	Ω	10%	±10%
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17	100Ω	1/4	Ω	10%	±10%
18	100Ω	1/4	Ω	10%	±10%
19	100Ω	1/4	Ω	10%	±10%
20	100Ω	1/4	Ω	10%	±10%
21	100Ω	1/4	Ω	10%	±10%
22	100Ω	1/4	Ω	10%	±10%
23	100Ω	1/4	Ω	10%	±10%
24	100Ω	1/4	Ω	10%	±10%
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46	100Ω	1/4	Ω	10%	±10%
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49	100Ω	1/4	Ω	10%	±10%
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89	100Ω	1/4	Ω	10%	±10%
90	100Ω	1/4	Ω	10%	±10%
91	100Ω	1/4	Ω	10%	±10%
92	100Ω	1/4	Ω	10%	±10%
93	100Ω	1/4	Ω	10%	±10%
94	100Ω	1/4	Ω	10%	±10%
95	100Ω	1/4	Ω	10%	±10%
96	100Ω	1/4	Ω	10%	±10%
97	100Ω	1/4	Ω	10%	±10%
98	100Ω	1/4	Ω	10%	±10%
99	100Ω	1/4	Ω	10%	±10%
100	100Ω	1/4	Ω	10%	±10%

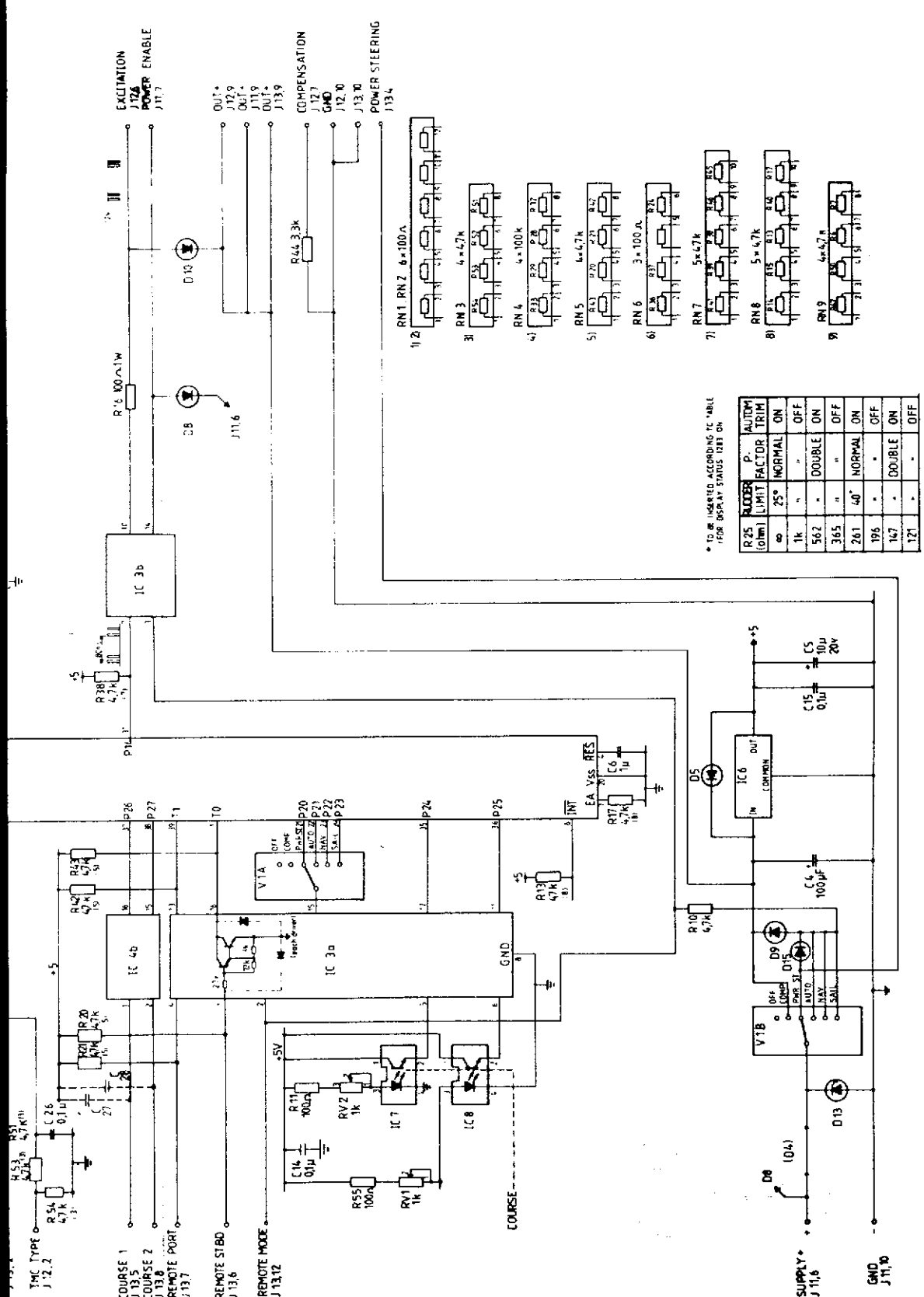


Fig. 6.3.
AP1000 Control Unit
Schematic diagram
 Drw.no. 1-017788

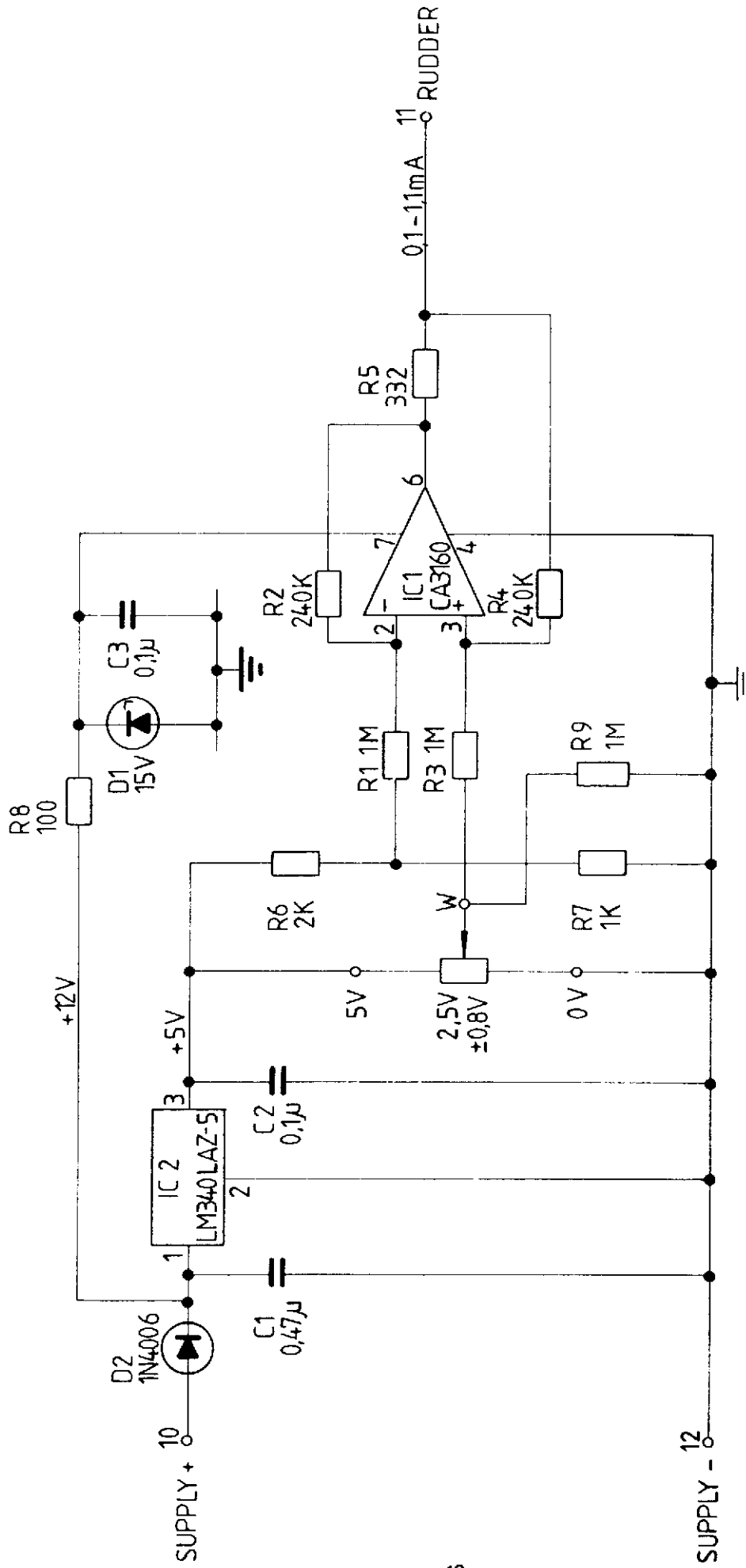


Fig. 6.8.
 RF100 Rudder Feedback Unit
 Schematic Diagram
 Drw. no. 3-010603B

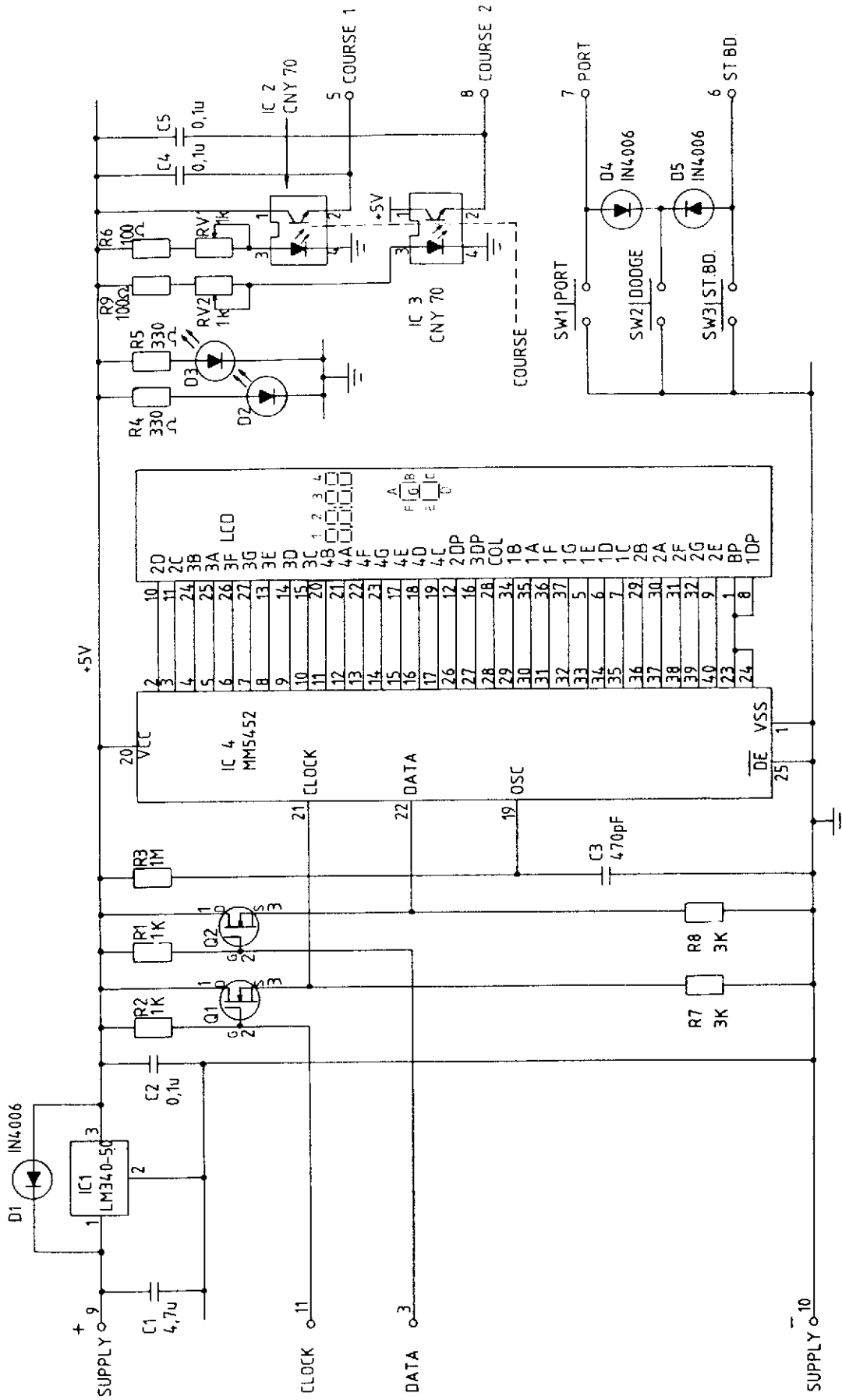


Fig. 6.7.
F100 Remote Control
Schematic diagram
 Draw.no. 3-010601F

PART NO.		
20103867	F100 Remote control	F100 Fjernkontrollenhet
20105888	Cable with plug (7m 12x0,22)	Kabel med plugg
20103818	P.C. board assembly	Printkort (komplett)
44116796	Voltage regulator IC1 LM340 LAZ5	Spenningsregulator
44116754	L.C.D. display 4 digits	LCD display 4 siffer
44115160	Light emitting diode D2 - D3 SPR 5531	Lysdiode
20104220	Control knob assembly (COURSE)	Kursvelgerknapp
20104253	Toothed wheel with shaft	Tannhjul med aksling
44117224	Push button switch SW1 - SW2 - SW3 (MPD)	Trykknappbryter
20103784	Actuator for SW1 - SW2 - SW3	Aktuator
20105227	Push button, red	Trykknapp, rød
20105235	Push button, green	Trykknapp, grønn
20105193	Push button, black	Trykknapp, sort
44190114	Gasket O-ring 3 mm	Pakning O-ring 3 mm
20105250	Remote control R100	Fjernkontroll R100
20105870	Cable 1324 with plug (7m)	Kabel 1324 med plugg (7 m)
44117257	Push button switch C&K 8125	Trykknapp C&K 8125
44114767	Push button cover red	Trykknappdeksel rød
44114759	Push button cover green	Trykknappdeksel grønn
20104923	Steering lever S100	Styrehendel S100
20105839	Cable 1324 with plug (2m)	Kabel 1324 med plugg (2 m)

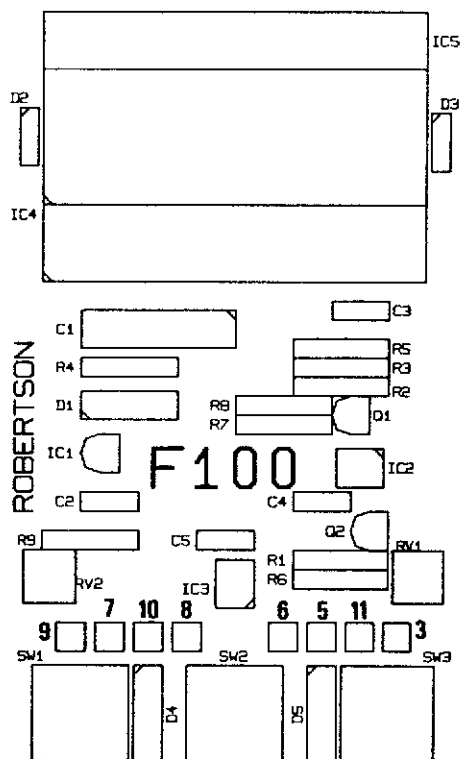
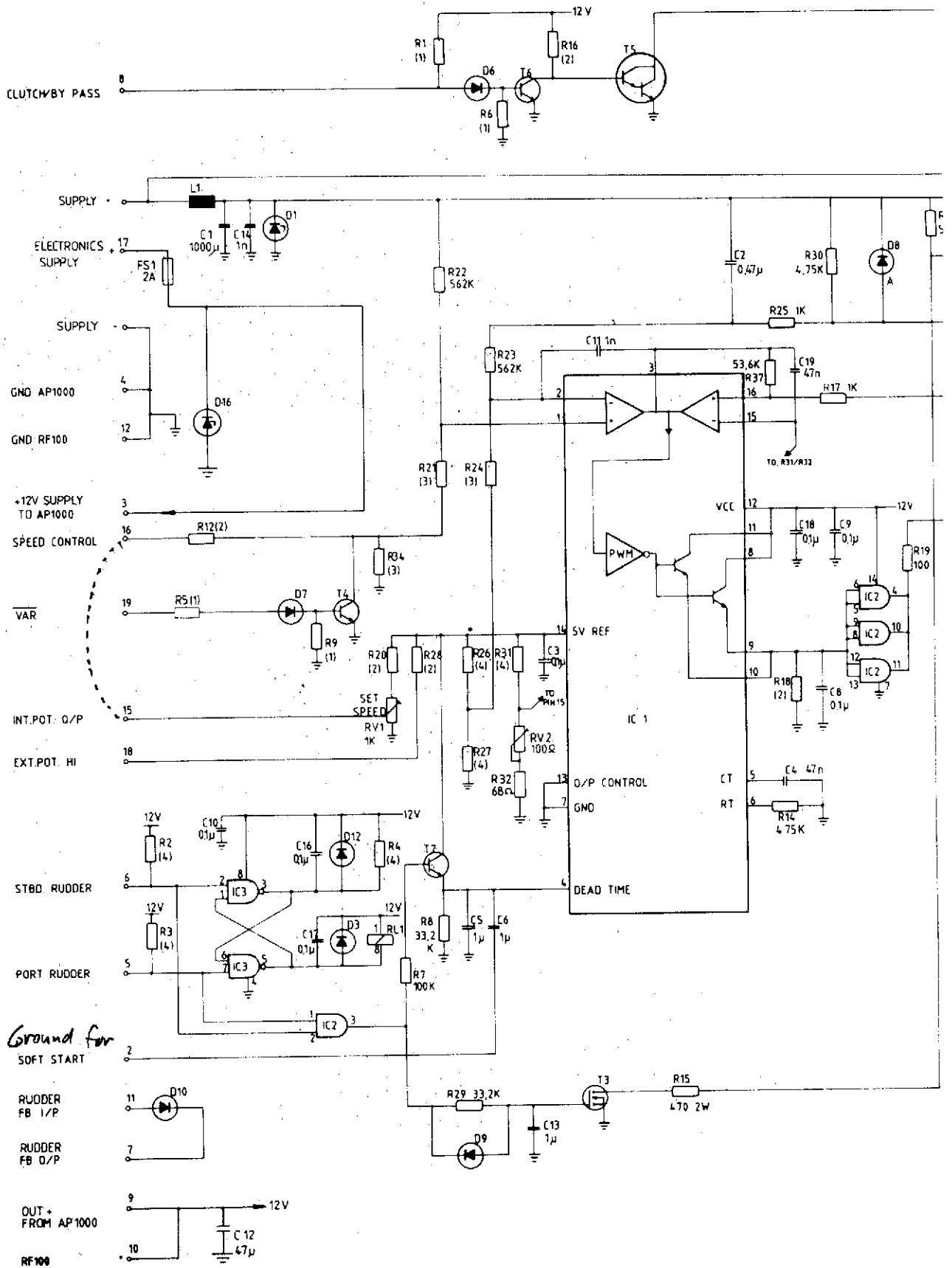
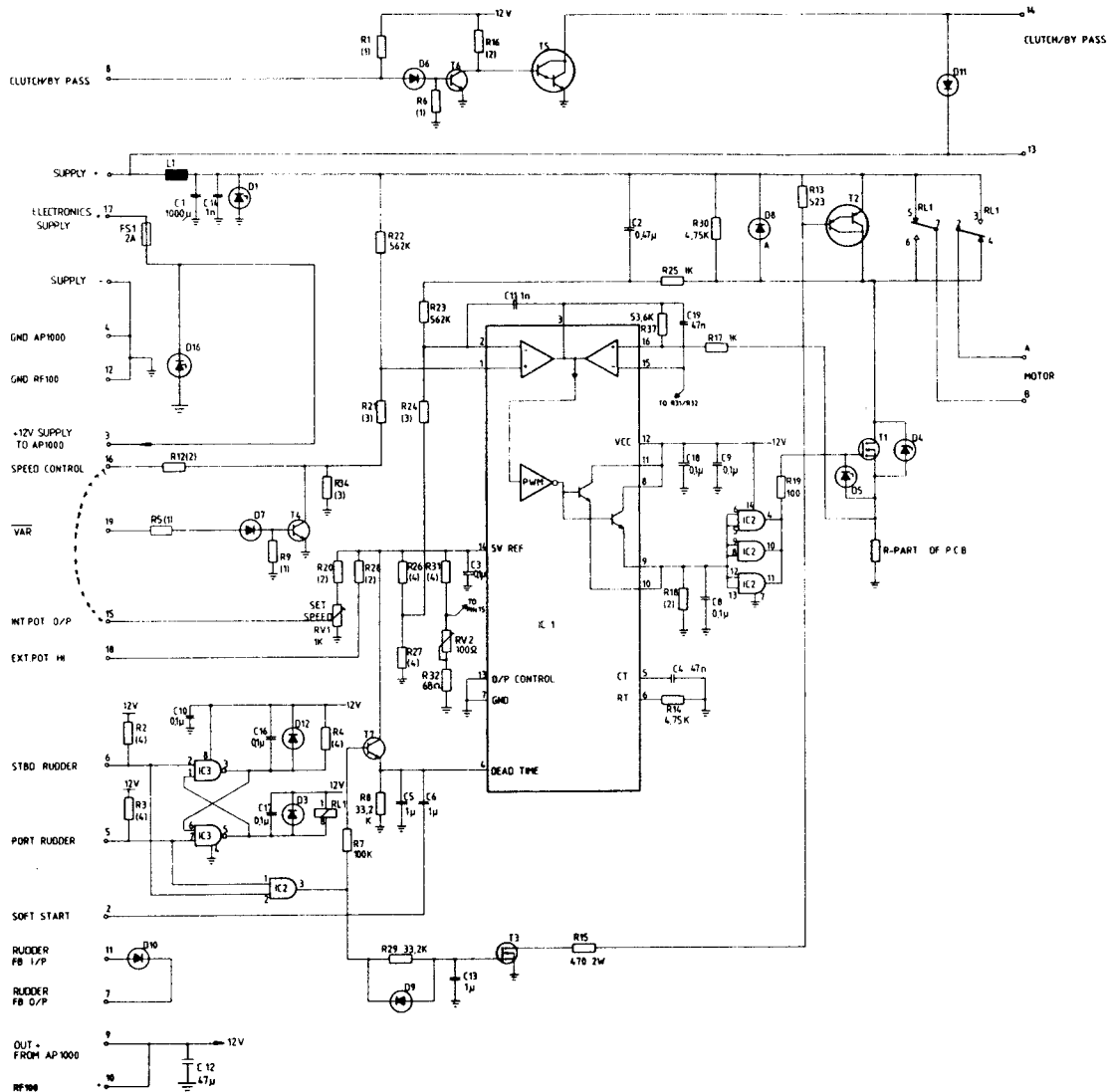


Fig. 6.6.
F100 Remote Control
Component reference

Drw.no. 3-010380E





D1	W 6287 A
D11	W 6066
D3,D4,D7	W 4548
D9,D10,D12	W 4548
D4	B2X 61 C43
D5	B2X 61 C12
D8	BY X26-300/600
T1	RF Z 39/BUZ 11
T2	80W 45/94A
T3	VN10K / VN2222L
T4,T6,T7	2N 2222 A
T5	2N 6388
K.1	TL 496
K.2	6081
K.3	6087
D16	W 5639 A

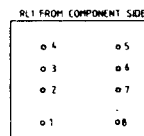
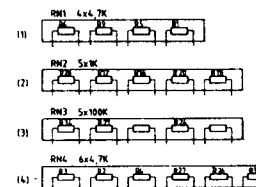


Fig. 6.5.
J1000 Junction Unit
Schematic diagram
Drw.no. 1-017899

PART NO.		
20178000	J1000 Junction Unit (with cable)	J1000 Koblingsenhet
20105847	Cable with plug (7m 12x0,22)	Kabel med plugg
20178018	PC. board assembly	Printkort (komplett)
44114866	Transistor T2 BDW 94A Darlington PNP	Transistor
44114734	Relay RL1 12V 10A 2 pole	Relé
44120525	Transistor T1 BUZ 11	Transistor
44103091	Transistor T5 2N6388	Transistor
44114841	Zener diode D1 1N6287A	Zenerdiode
44132348	Diode D8 BYX 96-600	Diode
22013098	RF100 Rudder Feedback Unit w/transmission link	RF100 Rorvinkelgiver m/overføringsstag
22013080	T100 Transmission link assembly	T100 Overføringsstag
22013106	RF100 Rudder Feedback Unit	RF100 Rorvinkelgiver
20102869	RI101 Rudder Angle Indicator w/standard mounting kit	RI101 Rorindikator med standard monteringssett
20105201	Mounting brackets	Festevinkler for braketmontering
20102927	Cable (12 m, 39 ft)	Kabel
20102844	PC.board assembly RI101	Printkort komplett RI101
44112233	Voltage regulator IC1 LM317T	Spenningsregulator
20102919	Meter 0,1-1,1 mA (RI101)	Instrument RI101
44117687	Lamp bi-pin 12V 40 mA	Lampe

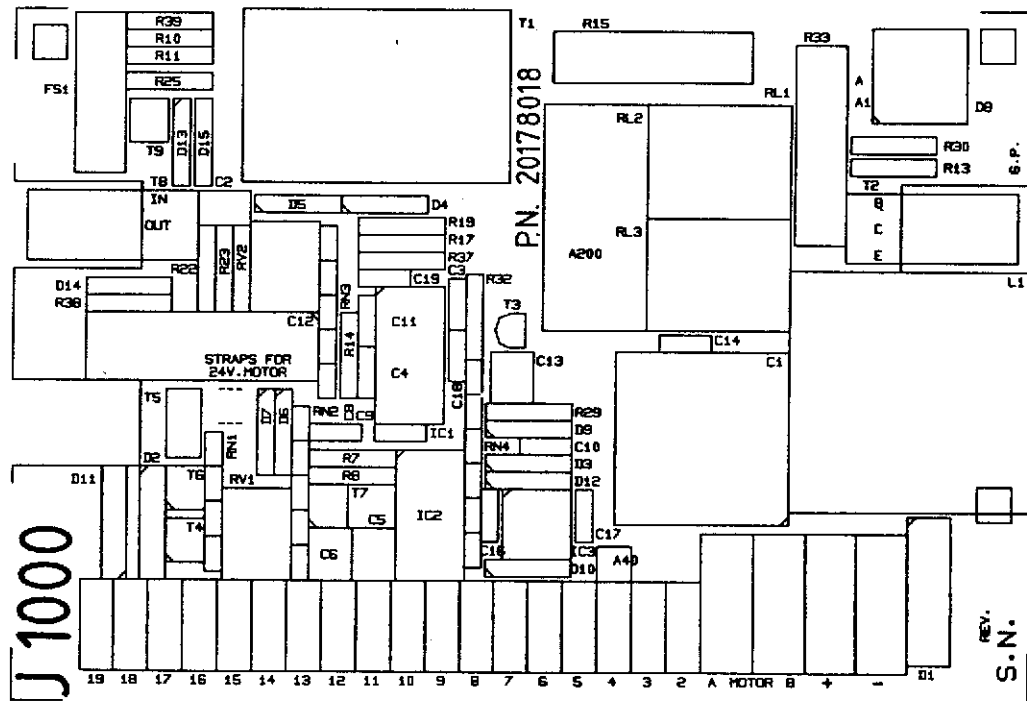


Fig. 6.4.
J1000 Junction Unit
Component reference
 Drw.no. 2-110047D

Technical Specifications

Optional Function	Available Equipment
Remote steering control	Fixed steering levers – FU1-9, FU9 (available autumn 1987) S9 Portable remote controls – F100-40, Dual station control – additional AP9 MKII control unit
Watch Alarm	External Watch Alarm control unit, WA9
Indication of vessel's rudder position	Rudder indicators for ceiling, bulkhead or panel mounting – Panorama, RI40
External selection of steering mode	External mode selector Auto/Helmsman (Follow-up, NFU) Selection is also possible using remote control F100-40 and S9
Control of bow thruster	AP9 MKII autopilot with specially adapted electronics. Separate external mode selector for switching between control of rudder(s) and control of rudder(s) and bow thruster.
Control of steering gear with double set of pumps and directional valves	Additional solid state PCB in the Distribution Unit
Control of steering gear systems with analog input	D93 Distribution Unit
Remote Digital Heading Indicator	SKR-80 Heading Indicator (connected to AP9 MKII Control Unit)
Use of fluxgate compasses other than Robertson manufacture	Fluxgate interface unit for Brooks & Gatehouse, VDO and Marinex compass units.

AP9 MKII Control unit

Dimensions H 137 mm (5,4") L 288 mm (11,4")
D 58 mm (2,3").

Weight: 3 kg (6.6 LBS).

Heading Reference: By plug-in interface unit to most types of gyrocompasses, stepper or synchro.
Serial data on 20 mA current loop.
Magnetic compass by fitting a course detector.
Fluxgate compass.

Navigation Interface: NMEA format 0180, 0183.

Alarms: Power failure, feedback failure, off course, watch alarm, navigational alarm, potential free contacts for external alarm, rudder watch.

Power Supply: 24V DC \pm 10% or 110/220V 50/60 Hz via Power Adapter.

Power Adapter

Dimensions: H 300 mm (11,8") L 320 mm (12,6")
D 105 mm (4,2").

Weight: 7 kg (15.4 LBS).

Input voltage: 110/220V 50/60 Hz.

Output voltage: 24V DC 3,2 A.

Signal Distribution Unit

Dimensions: H 300 mm (11,8") L 320 mm (12,6")
D 105 mm (4,2").

Weight: 4,5 kg (9.9 LBS).

Versions:

D90: Single 12–40V DC 3 Amp solid state switched output.
(For dual outputs extra PCB is required).

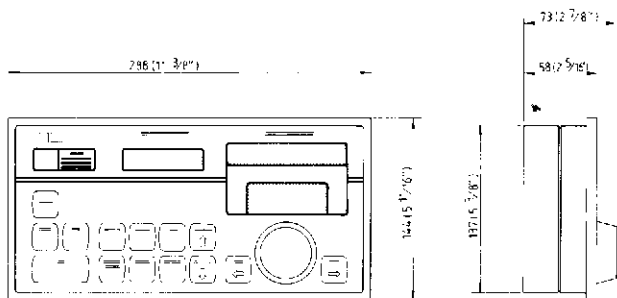
D91: Single 40–120V DC 1 Amp solid state switched output.
(For dual outputs extra PCB is required).

D92: Single 12–230V AC 1 Amp solid state switched output.
(For dual outputs extra PCB is required).

D93: Dual \pm 10V isolated analog signals.
(Zero point and max level adjustable).
4–20 mA current loop output.

D94: Single 12–40V DC 3 Amp solid state output.
Single \pm 10V isolated analog output or
4–20 mA current output.
(Named Thruster Interface Board).

Due to continuous product development all technical specifications are liable to change without prior notice.



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