

NORSOK STANDARD

SYSTEM REQUIREMENTS
TELECOM SUBSYSTEMS

T-SR-100
Rev. 1, January 1996

Please note that whilst every effort has been made to ensure the accuracy of the NORSOK standards neither OLF nor TBL or any of their members will assume liability for any use thereof.

CONTENTS

Subsystem	Title	Revision status
86-00	General	Rev. 1, January 1996
86-11	Public address and alarm	Rev. 1, January 1996
86-12	Driller's intercom	Rev. 1, January 1996
86-21	PABX	-
86-22	Multiplexer	-
86-24	Office data and telephone cabling network	Rev. 1, January 1996
86-25	Platform intercom	-
86-31	Radio links	-
86-35	Satellite links	-
86-37	Private radio network	-
86-38	Cable links	-
86-39	Fibre optic links	-
86-41	Mandatory radio (GMDSS) and general radio	Rev. 1, January 1996
86-42	UHF radio and paging	Rev. 1, January 1996
86-43	Audio and video entertainment	Rev. 1, January 1996
86-51	Closed circuit television (CCTV)	Rev. 1, January 1996
86-52	Meteorological observation	Rev. 1, January 1996
86-53	Marine radar	Rev. 1, January 1996
86-54	Aviation radar	-
86-55	Communication recorder	-
86-56	Loudspeaker surveillance	Rev. 1, January 1996
86-61	Shuttle tanker loading telemetry	-
86-62	Work-over telemetry	-
86-63	Pipeline telemetry	-
86-70	Navigational aids	-
86-71	Distance measuring equipment (DMF)	-
86-72	ATIS/AFTN for aviation	-
86-73	Positioning	-
86-81	Main distribution frame (MDF)	Rev. 1, January 1996
86-82	Telecom power supply	Rev. 1, January 1996
86-83	Real time clock	Rev. 1, January 1996
86-84	Telecom surveillance and Monitoring	Rev. 1, January 1996

0 GENERAL

0.1 Foreword

NORSOK (The competitive standing of the Norwegian offshore sector) is the industry initiative to add value, reduce cost and lead time and remove unnecessary activities in offshore field developments and operations.

The NORSOK standards are developed by the Norwegian petroleum industry as a part of the NORSOK initiative and are jointly issued by OLF (The Norwegian Oil Industry Association) and TBL (The Federation of Norwegian Engineering Industries). NORSOK standards are administered by NTS (Norwegian Technology Standards Institution).

The purpose of this industry standard is to replace the individual oil company specifications for use in existing and future petroleum industry developments, subject to the individual company's review and application.

The NORSOK standards make extensive references to international standards. Where relevant, the contents of this standard will be used to provide input to the international standardization process. Subject to implementation into international standards, this NORSOK standard will be withdrawn.

This standard replaces:

T-SR-001, Public address and alarm (PA)

T-SR-002, UHF radio and paging

T-SR-003, Driller's intercom

T-SR-006, Closed circuit television (CCTV)

T-SR-008, Audio and video entertainment

0.2 Scope

This standard covers telecommunication subsystems on an offshore installation.

This section defines common requirements to all sub-systems.

Please refer to the individual sections in this standard for details about individual telecommunication subsystems.

0.3 Normative references

NORSOK T-CR-001 Telecom systems.

NORSOK Z-CR-010 Installation of electrical, instrumentation & telecommunication.

0.4 Definitions and abbreviations

0.4.1 Definitions

Normative references Shall mean normative in the application of NORSOK standards.

Informative references Shall mean informative in the application of NORSOK standards.

Shall Shall is an absolute requirement which shall be followed strictly in order to conform with the standard.

Should	Should is a recommendation. Alternative solutions having the same functionality and quality are acceptable.
May	May indicates a course of action that is permissible within the limits of the standard (a permission).
Can	Can-requirements are conditional and indicates a possibility open to the user of the standard.
Subsystem	An assembly of equipment that fulfils a certain operational task.
Equipment	An individual functional unit.
Central equipment	Equipment that are the operational hub of individual subsystems.
Field equipment	Peripheral equipment connected to a subsystems central equipment.
IEEE 802.3	Medium access control protocol for network with bus topology (Ethernet).

0.4.2 Abbreviations

CC	Control Centre
LAN	Local Area Network
MDF	Main Distribution Frame
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair (when spare parts are available)
PA	Public Address and Alarm
TCP/IP	Transmission Control Protocol/Internet Protocol.
TER	Telecom Equipment Room
UPS	Uninterruptible Power Supply
WAN	Wide Area Network

0.5 Functional requirements

0.5.1 General

Requirements in section 0.5 are common to all subsystems.

0.5.2 Products/services

See individual subsystems.

0.5.3 Equipment/schematic

See individual subsystems.

0.5.4 Performance

See individual subsystems.

0.5.5 Regularity

0.5.5.1 Reliability

Reliability values stated below in this section are generally valid but are overruled by reliability values stated for individual subsystems. If 'availability' is stated for a subsystem, that value replaces the MTBF and MTTR values stated in this section.

Figures for MTBF and MTTR are minimum and maximum values respectively.

Central equipment:

MTBF	20 000 hours	(Minimum value)
MTTR	1 hour	(Maximum value)

Field equipment:

MTBF	40 000 hours	(Minimum value)
MTTR	2 hours	(Maximum value)

0.5.6 Process/ambient conditions

Equipment shall be designed to operate at environmental conditions according to project requirements.

0.5.7 Operational requirements

0.5.7.1 General

The equipment forming these subsystems shall be arranged for easy, safe and reliable operation. Equipment control panels should have text in the operator's National language, or unambiguous symbolic marking, explaining the operation of all controls.

0.5.7.2 Subsystems

See individual subsystems.

0.5.8 Maintenance requirements

Design shall allow for maintenance of equipment, or parts of equipment, quickly and with minimum disruption of service.

0.5.9 Isolation and sectioning

Some subsystems will lose mains power or DC power in a shutdown situation. Other subsystems may need the inclusion of shutdown relays or contactors. See sections for individual subsystems for details.

0.5.10 Layout requirements

See individual subsystems.

0.5.11 Interface requirements

Standard interfaces should be used between equipment and between sub-systems and systems.

Preferred data standards:

V.11 (RS 422)

V.24/V.28 (RS 232) for short distances (i.e. in the same room)

V.35

G.703

0.5.11.1 Alarms

Major subsystem alarms ON/OFF outputs.

Voltage and earth free change-over relay contacts in equipment

Comprehensive alarms If used, shall comply with TSR-100, Telecommunication surveillance.

0.5.12 *Commissioning requirements*

Design shall allow for testing and commissioning of subsystems and individual equipment with minimum disruption of normal operation.

0.6 INFORMATIVE REFERENCES

None.

11 PUBLIC ADDRESS AND ALARM

11.1 FOREWORD

This is a section of NORSOK Standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

This section replaces T-SR-001, Public address and alarm (PA).

Annex A and B to this section are normative.

11.2 SCOPE

This section defines the requirements for the Public address and alarm system on offshore production installations.

11.3 NORMATIVE REFERENCES

See section 0.

11.4 DEFINITIONS AND ABBREVIATIONS

See section 0.

11.5 FUNCTIONAL REQUIREMENTS

11.5.1 General

The Public address and alarm system shall distribute alarm tones, emergency messages and routine messages to all or selected areas of the installation. In areas with a high acoustical noise level alarm tones and emergency messages shall be complemented by yellow flashing lights.

11.5.2 Product/services

None.

11.5.3 Equipment/schematic

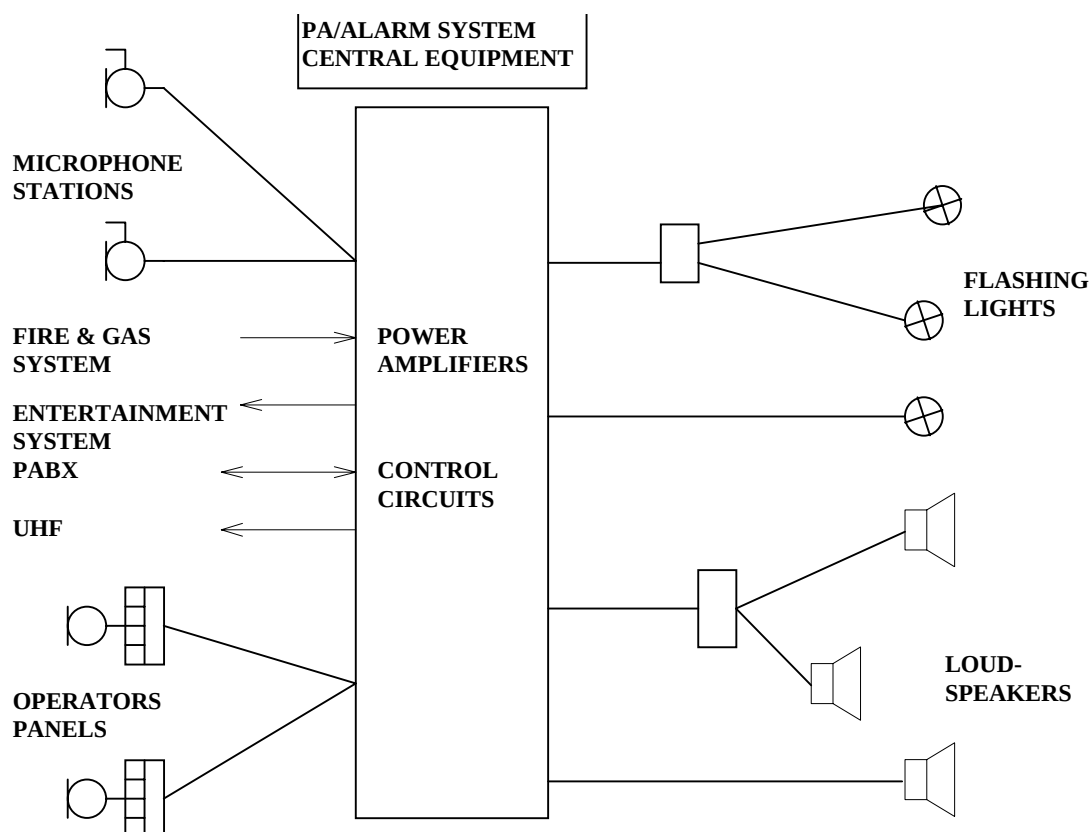


Figure 1. Equipment/schematic diagram

11.5.4 Performance

11.5.4.1 Speech signal conditioning

Frequency response	300-7000Hz with adjustable frequency shaping.
Automatic level control (ALC)	Slow time constant, adjustable threshold level.
Dynamic range compression	Quick time constant syllabic compressor, adjustable threshold level, to boost average speech power to at least 50% of peak speech power.

11.5.4.2 Alarm tone signals

'Muster alarm'	Uninterrupted tone with sweeping sinusoidal frequency from 1200Hz to 500Hz with sweep period 1 second, ref. ISO/TC159/SC5/WG 3-N.64.
'General alarm'	Sinusoidal tone 1000Hz, 1 second on, 1 second off.
'Toxic gas alarm'	(Only if this alarm is applicable): Sinusoidal tone 1000Hz, 0.1 second on, 0.1 second off, in bursts of duration 1 second, alternating with 1 second silence.

11.5.4.3 Attention signals

Emergency message	Combined signal of 450Hz and 1000Hz unfiltered square wave tones of 1 second duration (gong) to precede speech messages.
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Normal message	Sequenced signal of 554Hz and 440Hz sinusoidal tones of 1 second duration (ding-dong) to precede speech messages.
11.5.4.4 Loudspeaker test signal	
Test tone	Low level audio signal for testing of loudspeakers.
11.5.4.5 Amplifier output	
Output voltage limit	The output voltage shall not exceed a level that may cause short term or long term damage to loudspeakers.
Output idle noise	At standby the A-weighted noise voltage across any loudspeaker shall be at least 70dB below the nominal line voltage.
11.5.4.6 Audio coverage	
Method of calculation	Predicted Articulation Index for speech according to ANSI S 3.5-1969 and ISO Technical Report 3352.
Speech in low noise areas	AI=0.7, applicable in recreation areas, offices, and similar.
Speech in high noise areas	AI=0.35, applicable in noisy areas with up to 83dBA noise level.
Speech in very high noise areas	For areas with noise level of 83dBA or more, the system design shall be as if the main noise sources are shut off.
Alarm tones	Audio level shall be minimum 10dB above a background noise level up to 83dBA.
11.5.4.7 Flashing lights	
Actual areas	In areas with background noise level of 83dBA or more, alarm signals and emergency messages shall be complemented by flashing yellow lights.
11.5.5 Regularity	
11.5.5.1 Overall design	
Design shall be such that no single failure in systems, equipment or cabling network nor any single external event shall cause significant reduction of audio coverage in any area (ref. clause 11.5.4.6). A failure in a microphone station, an operator's panel, or an interface for the PABX may leave that particular part of the system inoperable.	
11.5.5.2 Reliability	
MTBF for central equipment at normal supply voltage, temperature and humidity: 25 000 hours with 5% full power output and 95% standby.	
11.5.6 Process/ambient conditions	
None.	
11.5.7 Operational requirements	
11.5.7.1 Acoustical feedback	
Microphones	Means shall be provided to counteract acoustical feedback from operators' microphones and microphone stations.
Telephones	A record/replay facility shall be included to avoid acoustical feedback when telephones are used to access the system.
11.5.7.2 Muting	
Alarm tones	Alarm tones shall be fully muted for the duration of speech messages.

Entertainment system	When alarms and 'Emergency Message' voice messages are broadcast, the PA System shall transfer a muting signal to the entertainment system (to silence all entertainment audio).
11.5.7.3 Priorities	
Priority programming	The relative priority for the following items shall be easily programmable with full flexibility: - Alarm types - Speech modes
11.5.7.4 PABX interface	
Acknowledge	When calling into the PA system via the PABX the user shall receive an acknowledge signal before the speech path is made available.
11.5.7.5 Operator's panel	
Microphone	Goose neck, near field, noise cancelling, insensitive to electromagnetic fields (ref. EMC requirements). Optional: Socket for hand-held microphone with PTT button.
Push buttons	- Alarm buttons - Emergency message button - Cancel alarm button - Talk button - Zone buttons - Lamp test button
Push button operation	Mechanically non-latching.
Visual indication	Integrated in each push button or by LED's clearly related to each button.
Other facilities	Speech level indicator (VU meter).
11.5.7.6 Operator's panel for speech only	
Items included	- Microphone, as described above - Talk button - Zone buttons - Speech level indicator (VU meter) - Lamp test button
11.5.7.7 Microphone stations	
Microphone	Handheld, near field, noise cancelling, fitted with push-to-talk (PTT) button.
11.5.7.8 Detailed operation of the system	
Refer to annex A.	
11.5.8 Maintenance requirements	
Supervision	Audio circuits for alarm tones and speech shall be supervised up to and including power amplifiers. The loudspeaker and flashlights distribution system shall be supervised for short circuit and earth fault.

Test facilities Internally generated test tone signal addressable to loudspeaker zones.
External audio auxiliary input addressable to loudspeaker zones.
External audio test signal input to each amplifier unit.

11.5.9 Isolation and sectioning

None.

11.5.10 Layout requirements

Typical layout of operators' panels. Refer to annex B.

11.5.11 Interface requirements

From the PABX	4W E&M
From a test generator etc.	Balanced audio input, 600 ohm
To the UHF mobile radio	2W balanced, 600 ohm, and transmitter key system ON/OFF
From the Fire & Gas system	'Toxic Gas Alarm' (if applicable): PA zones ON/OFF, alarm ON/OFF
	'General Alarm': PA zones ON/OFF, alarm ON/OFF
To the entertainment system	Muting ON/OFF
ON/OFF signals	Source shall provide a voltage free relay contact - open when OFF (normal state) - closed when ON (active state)

11.5.12 Commissioning requirements

Early use	Design shall be prepared for early use of the central equipment and all or part of the loudspeaker distribution system during platform commissioning.
Temporary use	Design shall be prepared for the use of temporary operator panels.

ANNEX A DETAILED OPERATION OF THE PUBLIC ADDRESS AND ALARM SYSTEM

A.1 Alarms set automatically by external signals

A.1.1 General alarm (set by the fire and gas system)

1. **The General Alarm is set and zones are selected by external signals.** The corresponding alarm button, the corresponding zone buttons, and the 'Emergency Message' button light up on all operators' panels. The alarm tone is sounded and PA flashing lights are switched on in the selected zones.
2. **Press the 'TALK' button** to broadcast a message preceded by the Emergency Message alert signal in the selected zones; the alarm tone is fully muted while the TALK button is held down.
3. **Press the 'Cancel' button** to cancel audio alarm and flashing lights.
4. **Restart the alarm**, if required, by pressing the 'General Alarm' button and relevant zones.

A.1.2. Toxic gas alarm (if applicable)

As for General Alarm, except Toxic Gas Alarm is set .

A.2 Alarms set manually from PA/Alarm operators' panels

A.2.1 Muster alarm

1. **Press the 'Muster Alarm' button.**

The Muster Alarm button lights up on all operators' panels

All zones are automatically selected, even if a different zone selection was set before.

The All Zones button and the Emergency Message button lights up on all operators' panels.

The alarm tone is sounded and PA flashing lights are switched on in all zones.

2. **Press the 'TALK' button** to broadcast a message preceded by the Emergency Message alert signal in all zones.

The alarm tone is fully muted while the 'TALK' button is held down.

3. **Press the 'Cancel' button** to cancel the alarm and bring the system back to normal.

A.2.2 General alarm

1. **Select relevant zones** (required only if different from all zones, since all zones are automatically selected if no zone buttons have been pressed).

2. If zone buttons are pressed, corresponding zone buttons light up on all operators' panels.

Press the 'General Alarm' button.

The 'General Alarm' button and the 'Emergency Message' button light up on all operators' panels (and if no zone buttons have been pressed, the 'All Zones' button lights up on all operators' panels).

3. The alarm tone is sounded and PA flashing lights are switched on in the selected zones.

Press the 'TALK' button to broadcast a message preceded by the Emergency Message alert signal in the selected Zones; the alarm tone is fully muted while the 'TALK' button is held down.

4. **Press the 'Cancel' button** to cancel the alarm and bring the system back to normal.

A.3 Voice messages

A.3.1 Emergency message

1. Press relevant zone buttons

Corresponding zone buttons light up on all operators panels (all zones except cabins are automatically selected if no zone buttons are operated).

2. Press the 'Emergency Message' button

The 'Emergency Message' button light up on all operators` panels.

3. Press the 'TALK' button to broadcast a message preceded by the Emergency Message alert signal in the selected zones.

PA flashing lights are switched on in the selected zones while the 'TALK' button is held down.

4. Press the 'Cancel' button to bring the system back to normal.

A.3.2 Normal message

1. Press relevant zone buttons (except the 'All Zones' button).

Corresponding zone buttons light up on all operators panels (all zones except cabins are automatically selected if no zone buttons are operated).

2. Press the 'TALK' button to broadcast a message preceded by the Normal Message alert signal in the selected zones

The corresponding zone buttons lights up on all operators panels while the 'TALK' button is held down.

A.4 Notes

Note 1: The 'Emergency Message' button.

The 'Emergency Message' button automatically lights up, and subsequent voice messages are automatically preceded by the Emergency Message alert signal after the 'All Zones' button has been pressed and until the 'Cancel' button is pressed.

Note 2: The 'TALK' button

The 'TALK' button shall light up on all operators panels when held down on one panel

Note 3: Cancellation of alarms/Emergency Message

Press the 'Cancel' button.

Note 4: Automatic return to default zone selection

Alarm automatically selected:

5 seconds after the external signals change to normal.

Alarm manually selected:

5 seconds after the alarm is cancelled.

'Emergency Message' button pressed, no alarm set:

When Emergency Message is cancelled.

‘All Zones’ button pressed:

When the ‘All Zones’ button is pressed again or when Emergency Message is cancelled.

Zone button different from All Zones’ button pressed:

When the zone button is pressed again or 5 seconds after the talk button is released.

Note 5: Multiple platform installations

For multiple platform installations, several ‘All Zones’ buttons may be required.

ANNEX B TYPICAL LAYOUT OF PUBLIC ADDRESS AND ALARM SYSTEM OPERATORS' PANELS

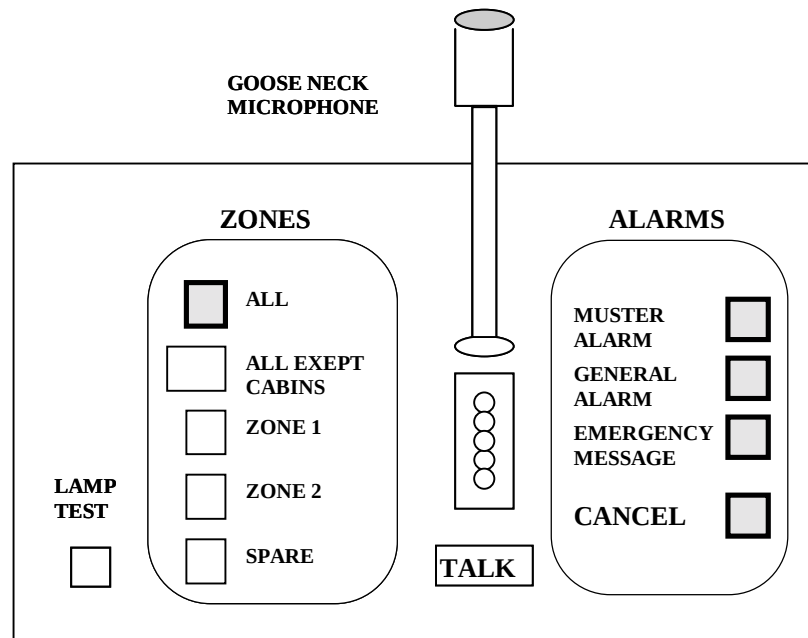


Figure B1 OPERATOR'S PANEL with PA and ALARM functions.

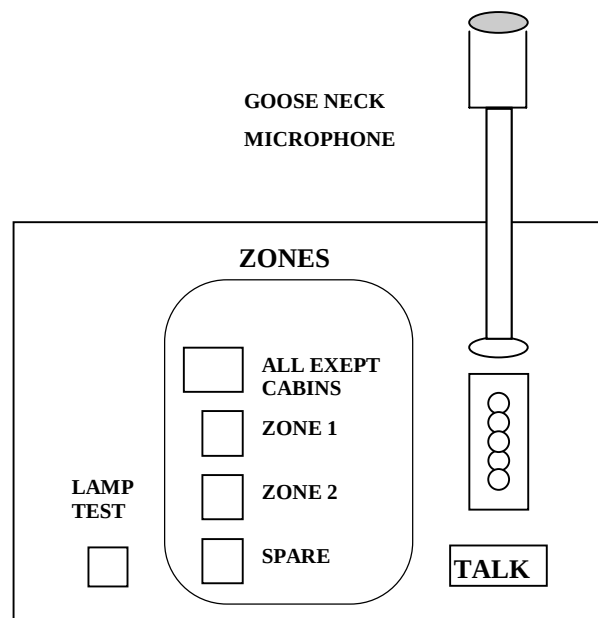


Figure B2 OPERATOR'S PANEL with PA function only.

12 DRILLER'S INTERCOM

12.1 FOREWORD

This is a section of NORSOK Standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

This section replaces T-SR-003, Driller's intercom.

12.2 SCOPE

This section defines the requirements for the Driller's intercom subsystem on offshore production installations.

12.3 NORMATIVE REFERENCES

See section 0.

12.4 DEFINITIONS AND ABBREVIATIONS

See section 0.

12.5 FUNCTIONAL REQUIREMENTS

12.5.1 General

The system shall provide two way voice communication in drilling related areas, between the driller and drilling personnel.

12.5.2 Products and services

None.

12.5.3 Equipment/schematic

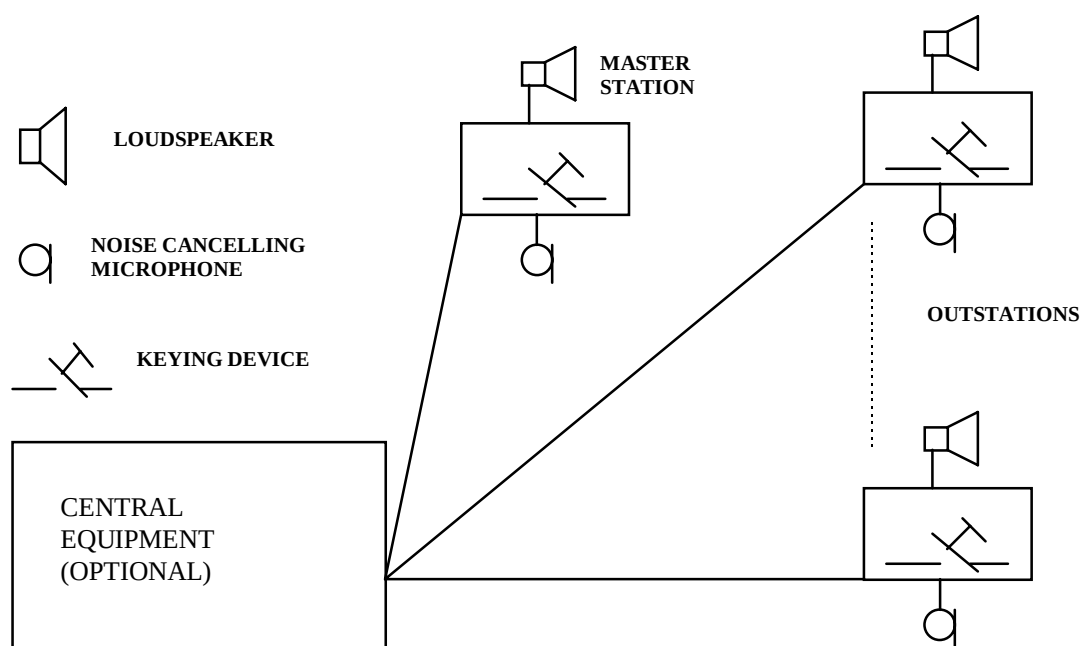


Figure 1 Equipment/schematic diagram.

12.5.4 Performance

12.5.4.1 System

Number of speech paths One.

12.5.4.2 Speech signal conditioning

Frequency response	300-7000Hz with adjustable frequency shaping.
Automatic level control (ALC)	Slow time constant, adjustable threshold level.
Dynamic range compression	Quick time constant syllabic compressor, adjustable threshold level to boost average speech power to at least 50% of peak speech power.

12.5.5 Regularity

99%.

12.5.6 Process/ambient conditions

None.

12.5.7 Operational requirements

The operational mode shall be free access, push-to-talk, one-to-all broadcast in a single network that includes a master station and a number of outstations. All stations shall operate in the same way, the only functional difference between the master station and the outstations being that the master station shall have access priority. Microphones shall be noise cancelling near field type.

12.5.8 Maintenance requirements

It shall be possible to operate the system in normal way even if an outstation is temporarily removed.

12.5.9 Isolation and sectioning

It shall be easy to isolate an outstation and its loudspeaker, microphone, and keying device, in order to fault trace the system.

12.5.10 Layout requirements

The outstations shall be wall mounted in a hazardous and environmentally extreme environment that includes drilling mud.

The master station shall be wall mounted or flush mounted in a console.

12.5.11 Interface requirements

None.

12.5.12 Commissioning requirements

None.

24 OFFICE DATA AND TELEPHONE CABLING NETWORK

24.1 FOREWORD

This is a section of NORSOK Standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

24.2 SCOPE

This section defines the requirements for the Data and telephone distribution network on offshore production installations. Telephone connections to process areas are not included.

24.3 NORMATIVE REFERENCES

See section 0.

EN 50173

ISO 8877

OLF

Recommended practice for offshore optical cable specification.

24.4 DEFINITIONS AND ABBREVIATIONS

Category 3 and 5

Specification for cables defined in EN50173.

Link class B and D

Link classification defined in EN50173.

24.5 FUNCTIONAL REQUIREMENTS

24.5.1 General

The network shall provide cabling for data and voice transmission between the central equipment and office/working areas.

24.5.2 Product and services

The cabling system consist of (with reference to terms used in EN 50173):

- Telecommunications outlets (TO).
- Distributor (EN 50173: Floor distributor).
- Central distributor or MDF (EN 50173: Building distributor).
- Horizontal cabling (From telecommunications outlet at the work area to the distributor).
- Backbone cabling (EN 50173: Building backbone cabling)(From the MDF to the floor distributor).

24.5.3 Equipment/schematic

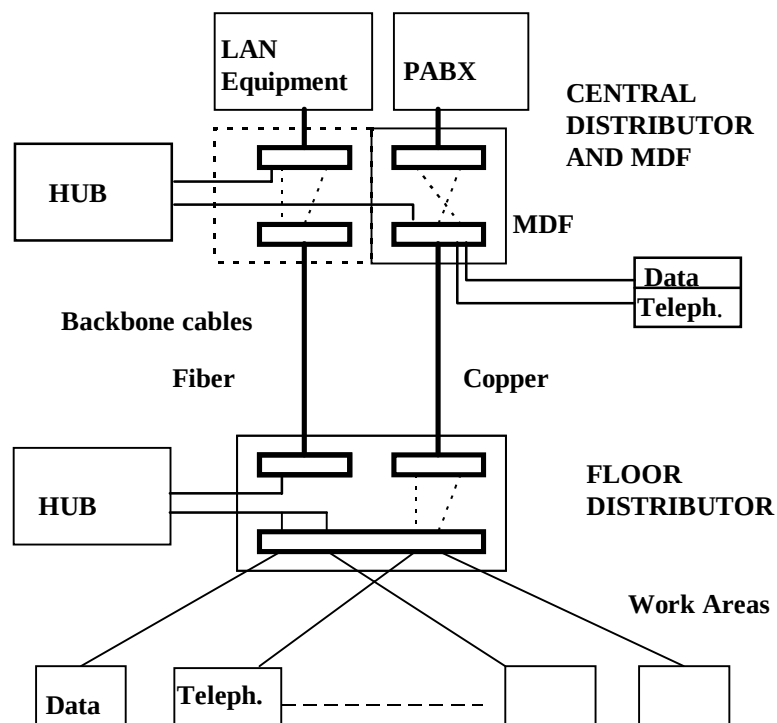


Figure 1 Central distributor and MDF.

24.5.4 Performance

24.5.4.1 Horizontal cabling

The horizontal cabling shall be used for voice (telephone) and data:

- Link classification: Link class D (or better)
- Cable type: 4-pair category 5 (or better) 100 ohm balanced cable
- For offices and normal work areas: 2 cables
- For cabins and other locations: 1 cable

24.5.4.2 Outlets

Telecommunication outlets in work area:

- ISO 8877 (RJ 45)

24.5.4.3 Copper backbone cabling

Copper backbone cabling shall be used for voice (telephone):

- Link classification: Link class B (or better)
- Cable type: 100 ohm balanced cable
- The cable shall be terminated in blocks with insulation displacement contacts (IDC)

24.5.4.4 Fibre backbone cabling

Fibre backbone cabling shall be used for data:

- Link classification: Optical link class
- Cable type: 62.5/125µ multimode optical fibre
- The cable shall be terminated in patch panels with ST connectors

24.5.4.5 Distributors

There shall be at least one distributor (normally in telecom. equipment room).

Decentralised distributors shall be used where the distance from work area to the telecom. equipment room exceeds 90 meter, or where local shut down and isolation may be required:

- The unit shall have: Termination for horizontal cabling, termination for backbone telephone cables, termination for backbone fibre cables and hub electronics for LAN.
- The cables from each office or work location shall be terminated adjacent to each other. Connectors (ISO 8877) or standard IDC termination blocks may be used.
- There shall be patching facilities to establish connection from the horizontal cable termination to the hub for data, and to the backbone copper cables for voice.
- The hub unit shall be connected to the backbone fibre cables.

24.5.5 Regularity

See section 0.

24.5.6 Process/ambient conditions

None.

24.5.7 Operational requirements

It shall be easy to reroute/reconfigure data or telephone channels without interrupting other traffic in the network.

24.5.8 Maintenance requirements

None.

24.5.9 Isolation and sectioning

It shall be easy to isolate a data or telephone connection, in order to trace the system.

24.5.10 Layout requirements

Layout requirements are:

- Patch panels and IDC blocks shall be mounted in 19" modules.
- All racks shall have sufficient spare room for active components.
- The central distributor for data and voice should be located adjacent to, or integrated with, the Main Distribution Frame (MDF).

24.5.11 Interface requirements

None.

24.5.12 Commissioning requirements

None.

24.6 INFORMATIVE REFERENCES.

Table 1 Connection standard for cables to the ISO 8877 (RJ45)

Pair no./part	Colour code	ISO 8877 pin no
1/a	White/Blue	5
1/b	Blue	4
2/a	White/Orange	1
2/b	Orange	2
3/a	White/Green	3
3/b	Green	6
4/a	White/Brown	7
4/b	Brown	8

41 MANDATORY RADIO (GMDSS) AND GENERAL RADIO

41.1 FOREWORD

This is a section of NORSOK standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

41.2 SCOPE

This section defines the requirements for the Mandatory radio and general radio subsystem, including GMDSS radio equipment, on offshore production installations.

For correct use of this section of the standard it is important to obtain a decision from the relevant body as to whether the offshore installation is located within sea area A1, or sea area A2.

41.3 NORMATIVE REFERENCES

Telenor (1)	Radio Inspection Services, Guidelines for the installation of GMDSS radio equipment on board ships and offshore units.
Norwegian Maritime Directorate (2)	Regulations of 16 December 1993 concerning the installation and use of radio equipment on mobile offshore units.
NORSOK T-CR-001 (3)	Telecom systems.
Other references (4)	See Section 0.

41.4 DEFINITIONS AND ABBREVIATIONS

41.4.1 Definitions

See section 0.

41.4.2 Abbreviations

GMDSS	Global Maritime Distress and Safety System
DSC	Digital Selective Calling
NDB	Non Directional Beacon
Other abbreviations	See Section 0.

41.5 FUNCTIONAL REQUIREMENTS

41.5.1 General

The Mandatory and general radio system shall provide marine and aeronautical communication for normal and distress situations.

The regulations for distress radio communication are given in references 1 and 2.

41.5.2 Products/services

None.

41.5.3 Equipment/schematic

41.5.3.1 Overall block diagram

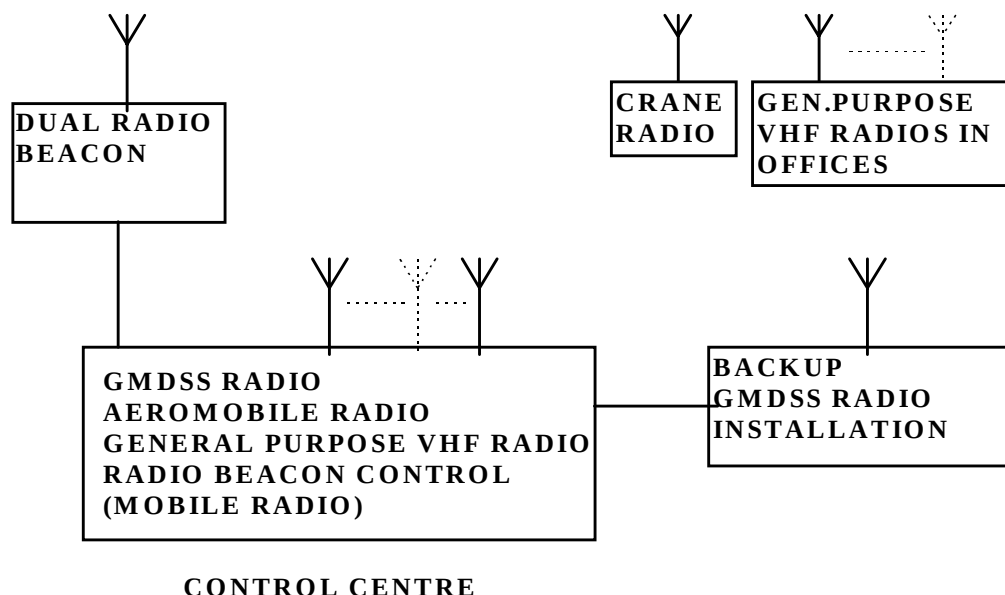


Figure 1 Overall block diagram.

41.5.3.2 Equipment

GMDSS radio equipment	- See reference 1
DC power supply	- See reference 1 and T-SR-100, Power supply for telecom systems
Aeromobile VHF/AM radios	- Fixed mounted - Portables
Aeromobile beacon	- Duplicated NDB
Marine VHF/FM radios	- Fixed mounted for crane(s) - Portables - Fixed mounted
Mobile telephone (if applicable with respect to coverage)	Fixed mounted
:	- Generally NMT 450 or NMT 900 mobile radio system (GSM may be used for a maximum distance between base station and outstation of approximately 35km)

41.5.4 Performance

Type approval	All radio equipment shall be type approved
Antenna feeder impedance	50 ohm nominal

41.5.5 Regularity

See section 0.

41.5.6 Process/ambient conditions

See section 0.

41.5.7 Operational requirements

- | | |
|--------------------------------|--|
| NDB | - ON/OFF of transmitter remotely controlled from the CC. |
| | - Duplicated transmitter with automatic changeover. |
| MF transceiver (if applicable) | - Remotely controlled radio unit. |
| Mobile radio | - Locally or remotely controlled. |
| Portable radios | - Monophone, headphone, and carrying harness. |

41.5.8 Maintenance requirements

See section 0.

41.5.9 Isolation and sectioning

None.

41.5.10 Layout requirements

41.5.10.1 Main operational location

Console or desk mounted:

- GMDSS equipment and/or remote controls for GMDSS equipment, including one marine VHF/FM/DSC radio.
- One marine VHF/FM radio for general purpose operation.
- Two aeromobile transceivers.
- ON/OFF remote control for NDB.
- Mobile radio or remote control for mobile radio (if applicable).

41.5.10.2 Backup operation location

Wall, console, or desk mounted:

- One GMDSS marine VHF/FM/DSC radio.
- Optional aeromobile VHF/AM radios.

41.5.10.3 Additional radios

Wall or desk mounted, powered from local mains:

- Marine VHF/FM radio(s) for miscellaneous use.
- Mobile radio(s).

41.5.10.4 Crane cabin(s)

Wall or console mounted, powered from local battery supply:

- Marine VHF/FM radio operationally co-ordinated with the crane UHF radio.

41.5.10.5 Antennas

See reference 3.

41.5.11 Interface requirements

See section 0.

41.5.12 Commissioning requirements

See section 0.

42 UHF RADIO AND PAGING

42.1 FOREWORD

This is a section of NORSOK standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

This section replaces T-SR-002, UHF radio and paging.

42.2 SCOPE

This section defines the requirements for the UHF radio and paging subsystem on offshore production installations.

42.3 NORMATIVE REFERENCES

See section 0.

42.4 DEFINITIONS AND ABBREVIATIONS

See section 0.

42.5 FUNCTIONAL REQUIREMENTS

42.5.1 General

The UHF mobile radio and paging system shall provide two way voice communication and one way paging in all areas of the installation.

42.5.2 Product/services

None.

42.5.3 Equipment/schematic

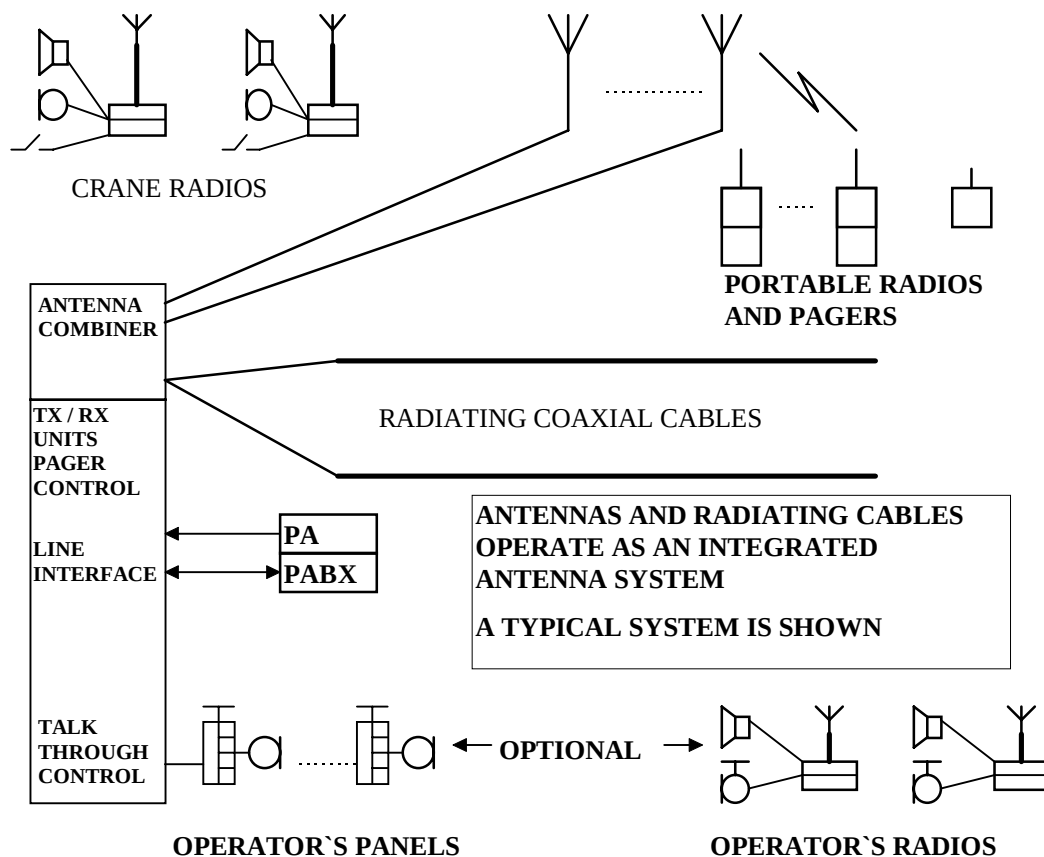


Figure 1 Equipment/schematic diagram.

42.5.4 Performance

42.5.4.1 General

Frequency band	UHF.
Bandwidth	All areas shall be covered by all channels including pager through the same antenna system.

42.5.4.2 Coverage

Signal strength	For all areas the average RF signal level shall be sufficient to produce an audio signal at the receiving end with at least 20dB SINAD. (Receiving sensitivity measured as 20dB SINAD, CCITT psophometrically weighed, with 1kHz tone at 60% deviation)
-----------------	--

42.5.4.3 Portable radios

Hazardous area certification	Intrinsically safe.
Channels	Dual frequency talk-through channels and single frequency direct channels.
Battery operation time	Minimum 12 hours with 90% receive and 10% transmit.

42.5.4.4 Operators' panels

Channels The same dual frequency channels as for portable radios.
Optional: At least 2 channels shall be selectable for simultaneous listening.

42.5.4.5 Operator's radios

Channels The same channels as for portable radios.

42.5.4.6 Crane radios

Channels The same single frequency and dual frequency channels as for portable radios.

42.5.4.7 Pagers

Hazardous area certification Intrinsically safe.
Channel One single frequency channel.
Message display Minimum 8 characters.
Signalling protocol Industry standard.

42.5.4.8 Base stations

Talk through activation Industry standard non-audible code with no access delay.
Talk through release Delayed, to avoid squelch noise burst in radios.

42.5.5 Regularity

42.5.5.1 Reliability for the central equipment

MTBF 25 000 hours for 50% TX / 100% RX duty cycle

42.5.6 Process/ambient conditions

None.

42.5.7 Operational requirements

42.5.7.1 General

Operator access:

Alternative 1 Through operators' fixed mounted radios with local (indoor) antenna.

Alternative 2 Through wired operators' control panels.

Alternative 3 A combination of alternatives 1 and 2.

42.5.7.2 Portable radios

Use With carrying harness and monophone or headset/boom microphone combination.

Battery The Ex classification shall allow for replacement of battery in hazardous areas.

42.5.7.3 Operator's radio

Microphone Handset with PTT button.

Handset cradle The loudspeaker shall operate also when the handset is out of its cradle and be muted when PTT button is operated.

Operation and functions Like a portable radio.

42.5.7.4 Crane radio

Microphone	Goose neck or similar.
Keying	Mechanical keying device for hands free operation.
Shared ancillaries	The microphone and keying device shall be used with the UHF crane radio as well as with a marine VHF radio.
Operation and functions	Like a portable radio.

42.5.7.5 Operators' panels

Controls	Channel selector, audio volume for loudspeaker.
Microphone	In handset with PTT button.
Handset cradle	The loudspeaker shall operate even if the handset is out of its cradle and be muted when PTT button is operated.
Operation and functions	Like a portable radio.

42.5.8 Maintenance requirements

42.5.8.1 Central equipment

Test facilities	Test panel for check of major parameters and functions.
Handset with PTT button	For listening and talking on any dual frequency channel.

42.5.8.2 Portable radios

Channel programming	From PC and by cloning.
Maintenance charger	Charger with discharging and reconditioning facilities for portable radios' rechargeable batteries.

42.5.8.3 Radiating coaxial cables

Connectors	All connectors and end terminators shall be easily accessible for disconnection for testing purposes.
------------	---

42.5.9 Isolation and sectioning

None.

42.5.10 Layout requirements

42.5.10.1 Crane radios

Typical mounting	Control unit, loudspeaker, microphone, keying device, and UHF/VHF selector switch shall be suited for integration with crane operator's chair.
------------------	--

42.5.10.2 Antennas and radiating coaxial cables

Distributed antenna system	Design must maximise radiation outside and inside of the installation and minimise radiation away from the installation - radiating coaxial cables shall provide coverage in all areas not covered by antennas.
----------------------------	---

42.5.11 Interface requirements

42.5.11.1 Central equipment, antennas

Connector type	N-type female, 50 ohm.
Lightning protection	Included.

42.5.11.2 Central equipment, to other systems

PA and PABX interface 2/4 wire E&M, 600 ohm audio.

42.5.11.3 Crane radios

Marine VHF radio interface Output from microphone and keying device for use with a
marine VHF radio in cranes.

42.5.12 Commissioning requirements

The system shall be prepared for early use of the central equipment and all or part of the antenna distribution system during platform commissioning.

43 AUDIO AND VIDEO ENTERTAINMENT

43.1 FOREWORD

This is a section of NORSOK Standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

This section replaces T-SR-008, Audio and video entertainment.

43.2 SCOPE

This section defines the requirements for the Audio and video entertainment subsystem on offshore production installations.

43.3 NORMATIVE REFERENCES

Technical part of	“Tekniske forskrifter for kabelnett/fellesantenneanlegg. Fastsatt av Samferdselsdepartementet 25. juni 1984 med senere endringer av 14. november 1984”
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43.4 DEFINITIONS AND ABBREVIATIONS

See section 0.

43.5 FUNCTIONAL REQUIREMENTS

43.5.1 General

The system shall provide facilities for audio and video entertainment and information in cabins and common rooms.

43.5.2 Products and services

The system shall include:

- Antennas and receivers/converters for satellite television, satellite radio and terrestrial VHF FM radio and television if applicable.
- Local audio and video sources.
- Modulators for radio and television.
- A community antenna system (CAS).
- Automatic television recording/playback facility.
- Standard consumer type television receivers and radio receivers for cabins and common rooms.

43.5.3 Equipment/schematic

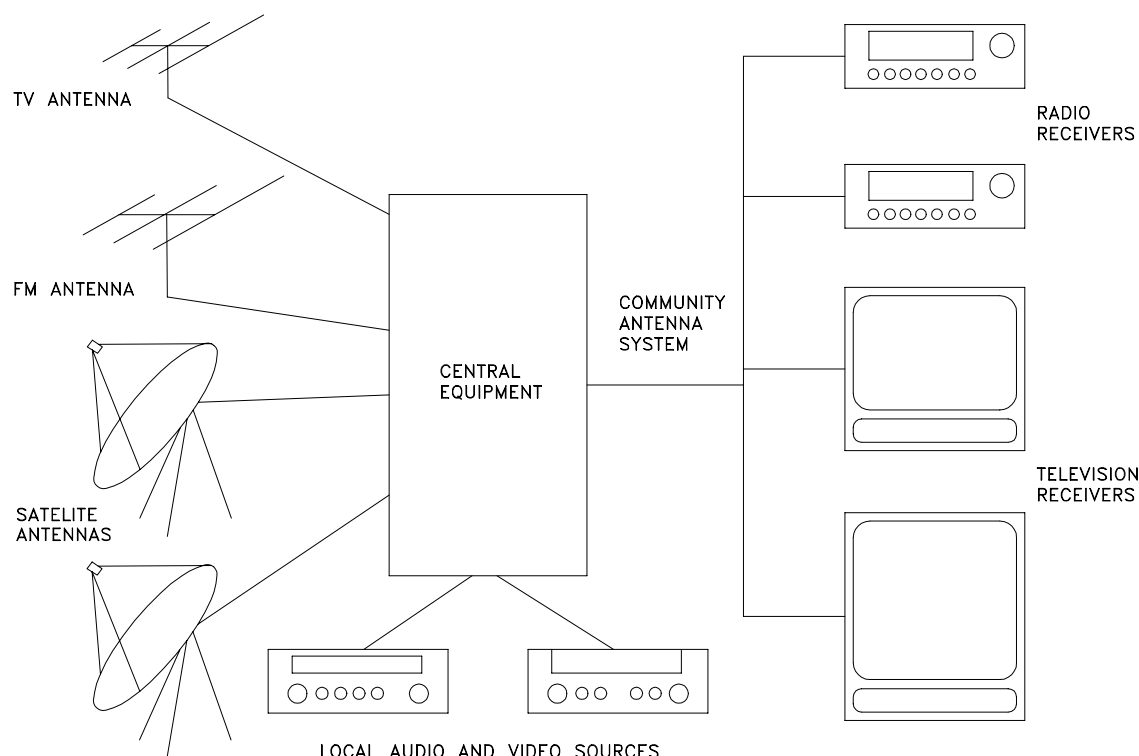


Figure 8.1 Equipment/schematic diagram.

43.5.4 Performance

43.5.4.1 Signal reception

Satellite antenna	Feeder loss shall be compensated for all frequencies to keep the RF signal level of all channels within the range required by the receiver.
Radio and TV antenna	Feeder loss shall be compensated by low noise preamplifier near the antenna.

43.5.4.2 Local signal sources

Audio playback	Compact Disk (CD) multiple disc player.
Audio recording/playback	Autoreverse compact cassette (optional).
Video recording/playback	Standard VHS with HI-FI stereo audio.
Timed video recording	Automatic recording of TV programme at pre-set time.
Timed video playback	Automatic playback at pre-set time.

43.5.4.3 Signal distribution

Television system	PAL.
TV frequencies	VHF and CATV channels 48-550MHz
FM radio frequencies	Standard European FM radio band, 19kHz pilot tone stereo.

43.5.4.4 Options

TV audio	NICAM stereo on selected channels.
TV video information service	Locally generated Teletext.
FM radio information service	Locally/remotely generated Radio Data System (RDS).

43.5.5 Regularity

None.

43.5.6 Process/ambient conditions

None.

43.5.7 Operational requirements

Entertainment audio shall be fully muted when a signal is received from the Public address and alarm system.

TV receivers should be the 'hotel' type with remote control and pre-programmed channels; reprogramming of channels by the end user shall not be possible.

Radio receivers shall include means to identify each radio channel.

The radio function may be incorporated in the TV receiver as an FM radio receiver operated by the TV remote control.

43.5.8 Maintenance requirement

None.

43.5.9 Isolation sectioning

None.

43.5.10 Layout requirements

None.

43.5.11 Interface requirements

From the PA and alarm system	Entertainment audio shall be muted when a voltage free contact in the PA and alarm system is closed.
------------------------------	--

43.5.12 Commissioning requirements

None.

51 CLOSED CIRCUIT TELEVISION (CCTV)

51.1 FOREWORD

This is a section of NORSOK Standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

This section replaces T-SR-006, Closed circuit television (CCTV).

51.2 SCOPE

This section defines the requirements for the Closed circuit television subsystem on offshore production installations.

51.3 NORMATIVE REFERENCES

See section 0.

51.4 DEFINITIONS AND ABBREVIATIONS

See section 0.

51.5 FUNCTIONAL REQUIREMENTS

51.5.1 General

The system shall provide real time visual surveillance in selected areas.

51.5.2 Product/services

None.

51.5.3 Equipment/schematic

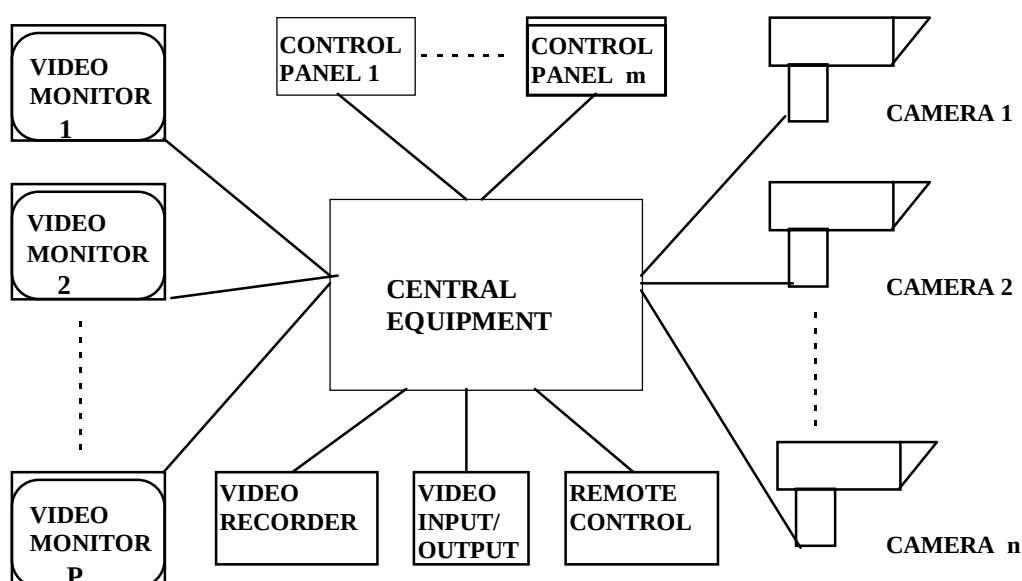


Figure 1 Equipment/schematic diagram.

51.5.4 Performance

51.5.4.1 Overall system

Television system	PAL colour.
Composite video level	1V peak to peak at 75 ohm.
S/N ratio	>45dB at peak white.
Crosstalk	>55dB at 5MHz.
Resolution (horizontal and vertical)	400 lines at normal illumination, 325 lines at 2 lux (note 1).
Picture stabilisation	No vertical or horizontal synchronisation error acceptable when changing between cameras.

51.5.4.2 Camera

Light sensitivity	2 lux reflected light (note 1) (with lens f 1:1.2) for >24dB S/N ratio.
Automatic gain control (AGC)	Linear operation.
Video level/contrast variation	Means shall be provided to minimise change at variable light conditions (note 2).
Lens zoom range (if applicable)	From 41° wide to 7° tele.
Iris control	Automatic with manual override.

Notes:

1. The system resolution shall be measured at 2 lux reflected light from a standard test picture located 1.5m in front of the camera lens.
2. System contrast shall be tested with a standard test picture located 1.5m in front of the camera lens: Picture modulation shall be at least 35% for 2 lux reflected light and at least 60% for good light conditions.

51.5.4.3 Camera pan angular travel

Pan and tilt (if applicable)	Minimum -/+ 90° horizontally and vertically.
Pre-set accuracy	-/+ 1° or better.
Speed	Variable from very slow to a maximum consistent with quick positioning when used with pre-set remote control.

51.5.5 Regularity

MTBF for camera	10 000 hours.
MTBF for monitor	10 000 hours.
MTBF for central equipment	25 000 hours.

51.5.6 Process/ambient conditions

None.

51.5.7 Operational requirements

As a minimum the system shall include the following facilities:

- All cameras switchable to all monitors.
- All controls necessary for remote operation located in the control panel(s).
- Internal programming protected against accidental changes.

- Alphanumeric information (minimum capacity 20 characters) shown on the video monitors, related to the camera in use, including: time, date, camera number, sequence information (if applicable), and descriptive text.
- Pre-set sequence (if applicable) for camera, including pointing direction, zoom, and time between changes programmable; all precept functions to be reprogrammable by the operator.

51.5.8 Maintenance requirements

See clause Isolation and sectioning.

51.5.9 Isolation and sectioning

Means shall be provided to switch off in a safe area all electrical signals for each camera and pan/tilt mechanism individually.

While work is being performed on cameras it shall be impossible to accidentally switch on electrical power and electrical signals.

51.5.10 Layout requirements

None.

51.5.11 Interface requirements

Video signal output/input	Composite video level 1V peak to peak at 75 ohm (for connection to external system).
Remote control	Serial asynchronous.

51.5.12 Commissioning requirements

See section 0.

52 METEOROLOGICAL OBSERVATION

52.1 FOREWORD

This is a section of NORSOK Standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

52.2 SCOPE

This section defines the requirements for meteorological observations and collection of environmental data on offshore production installations.

52.3 NORMATIVE REFERENCES

- | | |
|---------------------|--|
| Luftfartsverket (1) | Bestemmelser for sivil luftfart (BSL) D 5-1, 01.06.93 (Forskrift om kontinentalsokkelflyging - ...), section 8.1 "Meteorologisk utstyr". |
| WMO (2) | World Meteorological Organisation, No. 731, 1990, Guide on meteorological observation and distribution systems at aerodromes. |

52.4 DEFINITIONS AND ABBREVIATIONS

52.4.1 Definitions

None.

52.4.2 Abbreviations

- | | |
|------|---|
| DNMI | Det Norske Meteorologiske Institutt. |
| MRU | Motion Reference Unit (unit measuring motions of a moving/floating platform). |
| PMS | Platform Management System (system for stabilising of floating platforms). |

52.5 FUNCTIONAL REQUIREMENTS

52.5.1 General

The Meteorological observation system shall provide information on the weather conditions at the platform, for use by platform personnel and helicopter pilots.

If required, the system additionally shall perform automatic reporting to DNMI and Luftfartsverket.

52.5.2 Products/services

None.

52.5.3 Equipment/schematic

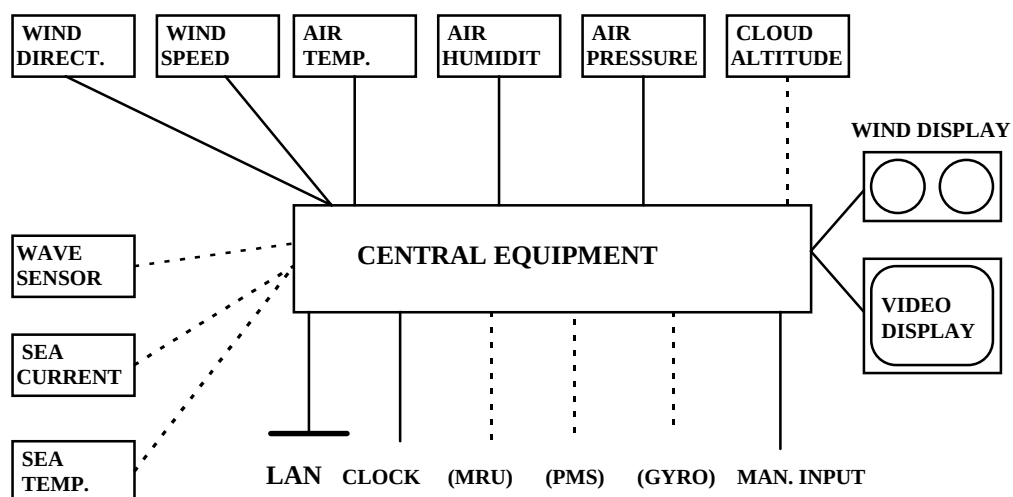


Figure 1 Equipment/schematic diagram.

52.5.4 Performance

- Mandatory observations
- Wind speed
 - Wind direction
 - Atmospheric pressure
 - Air temperature
 - Air humidity

Optional observations (when required)

- Wave height, period and direction
- Sea temperature
- Cloud base altitude
- Sea current

52.5.5 Regularity

See section 0.

52.5.6 Process/ambient conditions

See section 0.

52.5.7 Operational requirements

52.5.7.1 General

Automatic time tagging By internal clock updated by the platform's Real Time Clock.

52.5.7.2 Backup sensors

Mounted or ready for mounting

- Second wind speed sensor.
- Second wind direction sensor.

52.5.7.3 Local presentation of observations

For verbal information to helicopter pilots:

- Wind speed (knots).

- Wind direction.
- Pressure (hectopascal).
- Air temperature (Celsius).

For general information:

- Computer colour screen displaying all meteorological data.

52.5.7.4 Remote presentation to platform LAN

Data shall be submitted to the platform LAN with:

- Setable addresses.
- Setable intervals.
- Time tagging.

Data format: See annex A.

52.5.7.5 Optional

- PC program for displaying data through the platform's administrative LAN.
- Server function enabling LAN users to access data.

52.5.7.6 Reporting to DNMI (if required)

Data to be included Automatically collected meteorological data plus manually entered data to make up a complete message.

Data collection interval See annex A.

Telegram content and data protocol See annex A.

Time tagging UTC.

52.5.8 Maintenance requirements

For calibration check (minimum requirement):

- Air temperature portable sensor.
- Air pressure portable sensor.
- Humidity portable sensor.

Maintenance:

- See section 0.

52.5.9 Isolation and sectioning

None.

52.5.10 Layout requirements

- Location of sensors
- Sensors shall be located so as to avoid distortion of observations by air turbulence, high temperature, exhaust fumes etc.
 - Sensors for wind speed, wind direction, air temperature, and air pressure shall give observations that are relevant for the helicopter landing zone.
 - If reporting to DNMI is required, wind data shall be representative for the platform area.

52.5.11 Interface requirements

- Inputs
- Real Time Clock.

	- Data from Motion Reference Unit (MRU) (For non-fixed platform), if required for compensation purposes.
Outputs	The platform's administrative LAN.
Optional serial interface	V.11 or V.24
	Format: See annex A.
Alarms	See Section 0.

52.5.12 Commissioning requirements.

See section 0.

ANNEX A

HOLD

Note:

The work group has not yet succeeded in defining a report format for the content of a data telegram package. The format specification shall identify type of data and data format needed by different users, enabling each user to extract the information needed for his purpose.

The group will continue this work in 1996.

53 MARINE RADAR

53.1 FOREWORD

This is a section of NORSOK Standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

53.2 SCOPE

This section defines the requirements for a marine radar surveillance system with remote presentation of radar video and tracking information, and also remote radar control or remote surveillance.

This standard is not applicable for a normal radar installation with integrated ARPA functionality.

53.3 NORMATIVE REFERENCES

See section 0.

53.4 DEFINITIONS AND ABBREVIATIONS

ARPA Automatic Radar Plotting Aid

53.5 FUNCTIONAL REQUIREMENTS

53.5.1 General

- | | |
|-----------------------------|--|
| The overall system shall | <ul style="list-style-type: none">- Present information concerning vessel movements to a remote control centre and to PCs connected to the operators network.- Transfer control and command signals from a remote control centre to the radar processor.- Use existing LAN/WAN for distribution and presentation of radar information. |
| The radar processor shall | <ul style="list-style-type: none">- Present radar video and track information in a format that can be distributed on existing data networks and displayed on a PC having appropriate software installed.- Handle control signals and system information signals between a remote operation centre and the radar head(s). |
| Option, if required | <ul style="list-style-type: none">- A traffic operator's station utilising a DX90/S57 chart base, operating either stand-alone or in parallel with the remote control centre. |
| Optional remote environment | <ul style="list-style-type: none">- Integrated multi-radar surveillance control centre. |

53.5.2 Products/services

- | | |
|------------------------|--|
| Included in the system | <ul style="list-style-type: none">- Radar system.- Signal processor.- Software. |
| Option, if required | <ul style="list-style-type: none">- A traffic operator's station utilising a DX90/S57 chart base, operating either stand-alone or in parallel with the remote control centre |

53.5.3 Equipment/schematic

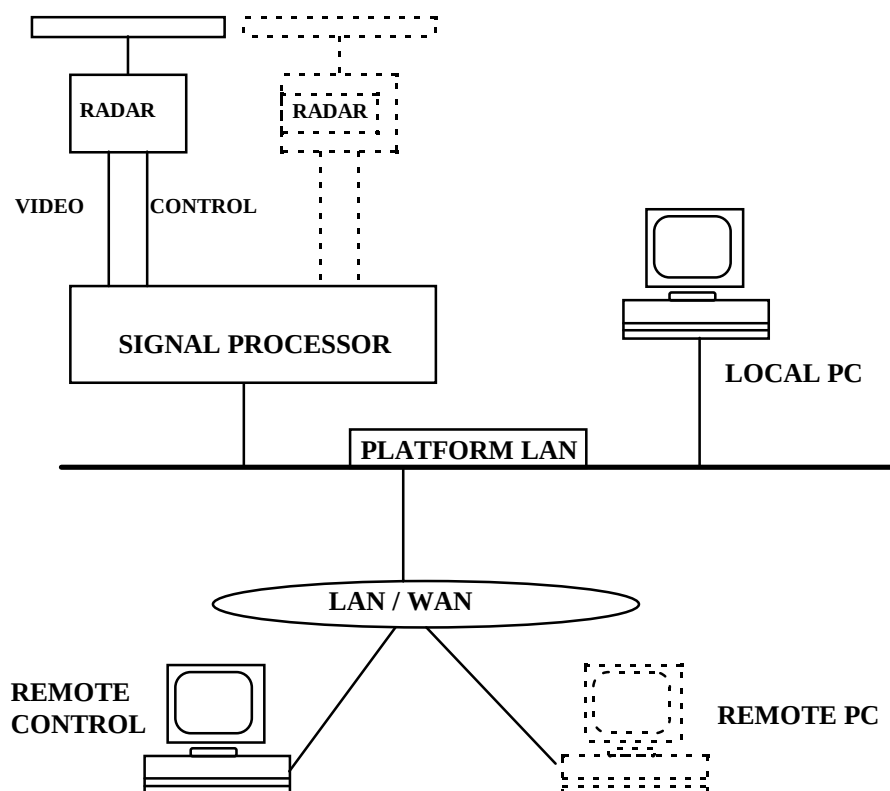


Figure 1 Equipment/schematic diagram.

53.5.4 Performance

Area coverage	360 degrees from less than 300 metres measured from the outer points of the installation and up to a radius of 8 nautical miles for vessels with a radar cross section of 25 sqm and 12 nautical miles for vessels with radar cross section of 100 sqm.
Minimum target size	Surface vessel with a radar cross section (RCS) of 25m ² with 3m height and 100m ² with 6m height.
Frequency band	S-band with horizontal polarisation or S-band with circular polarisation.
Antenna size	13' maximum.
Antenna height	40m typical.
Atmospheric condition	Standard
Target speed	5m/s
False alarm probability	1 ppm
Detection probability	80%
Swerling Case	5 for small targets
Sea state	5
Rain	10 mm/hr over whole path.
Calculation method	Complex include sea, rain and propagation losses.

53.5.5 Regularity

Availability	99% based on 24 hours operation.
--------------	----------------------------------

53.5.6 Process/ambient conditions

See section 0.

53.5.7 Operational requirements

Remote presentation	Digital video and tracking information superimposed on a digital chart (DX90/S57) on PC based workstations, including facilities for adding user defined objects and layers. Digital video resolution shall not be affected by setting of individual range and centre.
Information only presentation	Radar track superimposed on a digital chart base including user defined objects and layers for local PC-based presentation.
Remote control minimum requirements	- Start/stop of scanner. - Adjustment of pulse length. - Transceiver selection.

53.5.8 Maintenance requirements

See section 0.

53.5.9 Isolation and sectioning

None.

53.5.10 Layout requirements

None.

53.5.11 Interface requirements

Local radar LAN	TCP/IP protocol, IEEE 802.3.
-----------------	------------------------------

53.5.12 Commissioning requirements

See section 0.

81 MAIN DISTRIBUTION FRAME (MDF)

81.1 FOREWORD

This is a section of NORSOK standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

81.2 SCOPE

This section defines the requirements for distribution frames for equipment cabling including shutdown facilities for field equipment.

81.3 NORMATIVE REFERENCES

See section 0.

81.4 DEFINITIONS AND ABBREVIATIONS

See section 0.

81.5 FUNCTIONAL REQUIREMENTS

81.5.1 General

Distribution frames provide interchangeable connection facilities for telecommunication systems. The frames act as interface point for cabling between:

- Different telecommunication subsystems.
- Telecommunication central equipment and associated field equipment.
- Telecommunication systems and other systems on the installation.

Shutdown facilities shall provide possibility for disconnection of non-Ex equipment during hazardous conditions.

81.5.2 Product/services

None.

81.5.3 Equipment/schematic

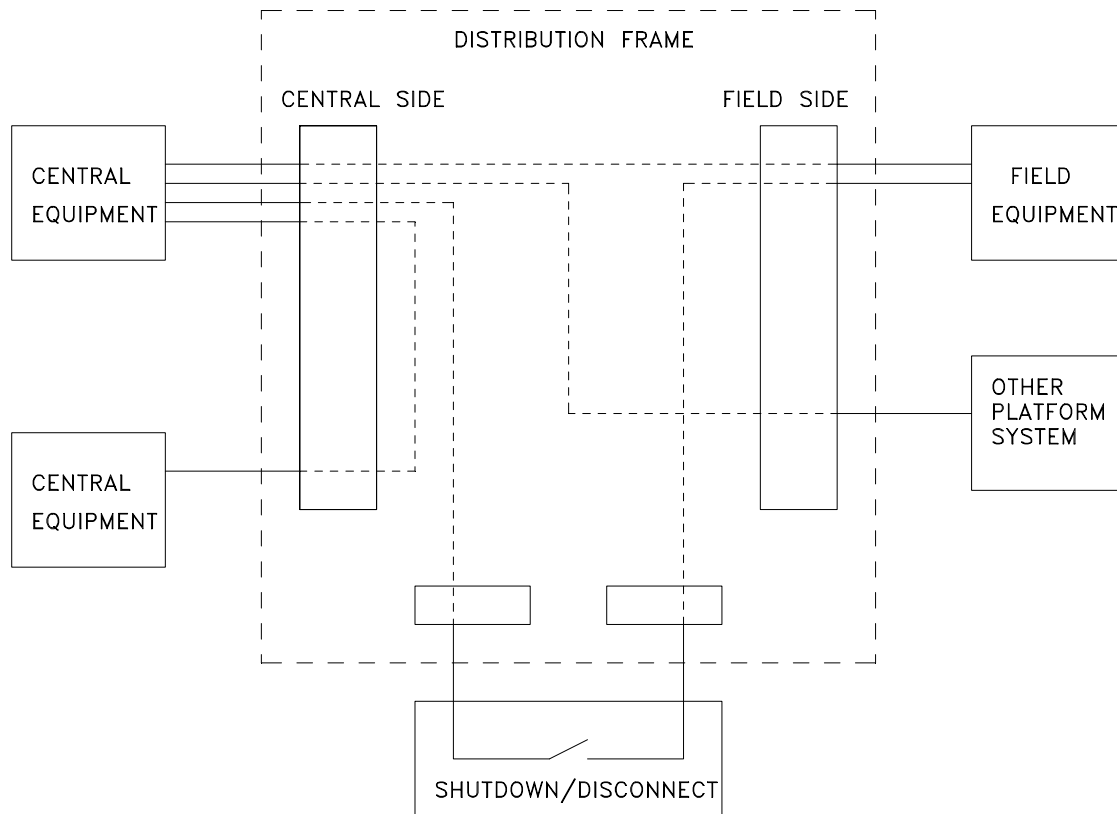


Figure 1 Equipment/schematic diagram.

81.5.4 Performance

81.5.4.1 Terminal blocks/single terminals in distribution frames

Terminal blocks shall be of a modular type with a minimum of eight terminals per strip.

Blocks for termination of 0.5-1.0mm Ø solid cores shall have insulation displacement contacts (IDC).

Terminals for multistranded wires shall be of clamp spring type, and allow termination of 0.5-2.5mm Ø stranded cores.

Wire-wrapping-, soldering-, or screw terminals should be avoided.

All types of terminals shall have circuit isolation and testing facilities.

81.5.4.2 Voice frequency circuits

Termination of voice frequency circuits shall be terminated as defined in annex A.

81.5.4.3 Spare capacity

Ref. T-CR-001, clause 5.6.3.

81.5.4.4 Shut down facilities

Facilities for disconnection of lines shall be arranged in modules, easily expandable.

81.5.5 Regularity

None.

81.5.6 Process/ambient conditions

None.

81.5.7 Operational requirements

81.5.7.1 Alarms (minimum requirement)

Power failure alarm Loss of power to shut down module

81.5.8 Maintenance requirements

None.

81.5.9 Isolation and sectioning.

None.

81.5.10 Layout requirements

The Main Distribution Frame (MDF) and the shut down facilities shall be located in the Telecom Equipment Room.

The Distribution frames should preferably be wall mounted and single sided.

Spacing between sections and rails in the distribution frames shall be sufficient to ensure easy access. Jumper rings or equivalent shall be included to allow tidy wiring to terminals in any part of the frame.

Central and field side cabling to the frames shall be allocated to different sections.

81.5.11 Interface requirement

81.5.11.1 Alarm output from shut down equipment

Individual alarms A voltage free contact normally closed. Open in alarm state or loss of power.

81.5.11.2 Input to shut down facility

ESD signals 24 VDC in normal condition.
 0 VDC in ESD alarm condition.

81.5.12 Commissioning requirements

None.

ANNEX A TERMINATION OF VOICE FREQUENCY CIRCUITS

Voice frequency circuits shall be terminated on terminal block strips, with one channel per strip.

A.1 2W E&M

Term. 1 or 1a	Transmit/receive
Term. 2 or 1b	Transmit/receive
Term. 3 or 2a	Not used
Term. 4 or 2b	Not used
Term. 5 or 3a	Ma
Term. 6 or 3b	Ea
Term. 7 or 4a	Mb
Term. 8 or 4b	Eb

A.2 4W E&M

Term. 1 or 1a	Transmit
Term. 2 or 1b	Transmit
Term. 3 or 2a	Receive
Term. 4 or 2b	Receive
Term. 5 or 3a	Ma
Term. 6 or 3b	Ea
Term. 7 or 4a	Mb
Term. 8 or 4b	Eb

82 TELECOM POWER SUPPLY

82.1 FOREWORD

This is a section of NORSOK standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

82.2 SCOPE

This section defines the requirements for uninterruptible DC Telecom power supplies.

Guidelines on dimensioning of battery capacity are included.

82.3 NORMATIVE REFERENCES

See section 0.

82.4 DEFINITIONS AND ABBREVIATIONS

See section 0.

82.5 FUNCTIONAL REQUIREMENTS

82.5.1 General

Equipment powered by supply:

- Essential telecom subsystems
- Mandatory and General Radio subsystem (normally 24V with floating plus and minus).
- PA system(s) (normally 48V with floating plus and minus).
- Miscellaneous subsystems (normally 48V with floating plus and minus).

82.5.2 Products/services

Individual supplies shall include:

- Battery bank
- Chargers mounted in cabinet(s)
- DC power distribution and fuses

82.5.3 Equipment/schematic

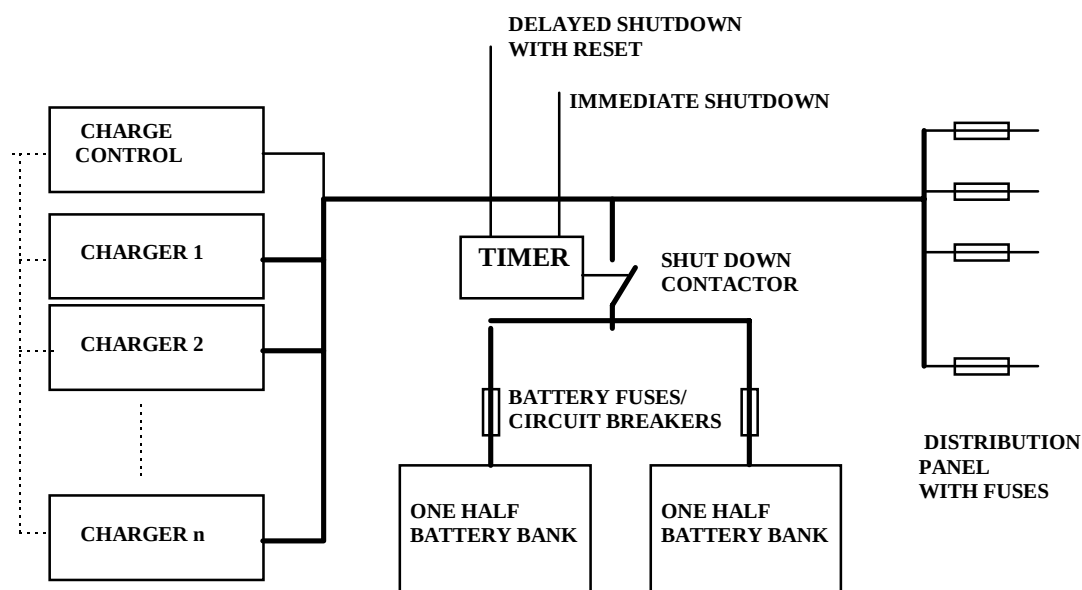


Figure 1 Equipment/schematic for one individual power supply.

82.5.4 Performance

The requirements below are mandatory except where indicated by 'preferred' etc.

82.5.4.1 Battery banks

Preferred battery type	Lead-acid with valve controlled gas discharge.
Battery cell voltage lower limit	1.80 V for lead acid batteries.
Battery bank subdivision	Two halves operating in parallel with 50/50% load sharing, individually fused.

82.5.4.2 Battery capacity evaluation

The capacity of each battery bank shall be sufficient to meet the load and ambient temperature requirements over the stated battery life time, with reference to Eurobatt guidelines.

Battery capacity shall be evaluated based on a realistic mean load current, taking various types of load currents into account, e.g.:

- Duty cycle dependent load current (e.g. the PA system and radio transmitters).
- Voice dependent load current (e.g. PA audio amplifiers and SSB transmitters).
- Utilisation dependent load current (e.g. due to the actual mean power consumed by the loudspeakers of the PA system).

82.5.4.3 Charger cabinet(s)

Design	Modular, for plug in charger units
--------	------------------------------------

82.5.4.4 Charger units

Battery charging method	Constant voltage float charging.
Input voltage	230VAC -30/+20V, 45-55Hz.
Output voltage	Battery manufacturer's recommended float charging voltage.
Output voltage limits at consumer	-10/+20% of nominal voltage.
Ripple voltage (worst case)	<2mV RMS psophometric.

	<50mV RMS flat, overall. <5mV RMS flat, $f > 3\text{KHz}$.
Radio interference	EN 55022 Class B.
Recharging time	10 hours from discharged state to 90% of full capacity with nominal load.
Current at overload	Constant current.
Quantity of plug in modules	$n+1$, where n is the required number of modules.
Load sharing between modules	Near the same fraction of the total load current supplied from each module at all loads.
Battery overcharging protection	Protection shall be included against voltages and currents that may cause overcharging of batteries with resulting excessive gassing.
Alarm output	See section 0.
82.5.4.5 Load distribution	
Location	Integrated with charger cabinet(s) or separate.
Fuses	Automatic.
82.5.4.6 Shutdown circuit breaker/timer	
In case shutdown is required, the following facilities shall be included:	
Shutdown circuit breaker	Installed in the battery leads close to the battery but outside the battery room (if separate); distances considered, the breaker may be located in the charger cabinet.
Shut down operation	Remotely initiated via two inputs: Delayed Shutdown and Immediate Shutdown.
Delayed shutdown	A timer shall start when delayed shutdown is initiated and shutdown shall occur at the end of the counting period; it shall be possible to reset the timer during and after its counting period.
Immediate shutdown	Timer is bypassed and no reset is allowed.
Reset of timer	Manually operated by push button on charger cabinet and by remote floating contacts.
Timer period	Adjustable between 5 and 30 minutes.

82.5.5 Regularity

100% on DC line output.

82.5.6 Process/ambient conditions

The operational temperature range for the batteries shall be based on reasonable assumptions with respect to possible minimum and maximum temperatures at the location where the batteries are located.

82.5.7 Operational requirements

82.5.7.1 Autonomy time

GMDSS radio subsystem PS	6 hours.
PA/Alarm subsystem PS	2 hours.
Other subsystems PS	6 hours.

82.5.7.2 Recharging time

From lower voltage limit 10 hours to 90% of nominal battery capacity.

82.5.7.3 Alarms (minimum requirement)

Charging failure alarm	When the current from each charger drops below a set limit.
Battery low alarm	When the power supply voltage drops below a set limit.
Overcharge alarm	When the power supply voltage exceeds a set limit.
Shutdown alarm	When the shutdown circuit breaker has been operated.

82.5.8 Maintenance requirements

Discharge testing	A facility shall be provided to perform discharge testing on one half battery bank which is disconnected from charger and load by means of its battery fuse/circuit breaker.
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82.5.9 Isolation and sectioning

None.

82.5.10 Layout requirements

None.

82.5.11 Interface requirements

Alarms	See section 0.
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82.5.12 Commissioning requirements

See section 0.

83 REAL TIME CLOCK

83.1 FOREWORD

This is a section of NORSOK standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

83.2 SCOPE

This section defines the requirements for a real time clock system as a common time reference for offshore production installations.

83.3 NORMATIVE REFERENCES

See section 0.

83.4 DEFINITIONS AND ABBREVIATIONS

None.

83.5 FUNCTIONAL REQUIREMENTS

83.5.1 General

Purpose of the system	Generation of real-time signals as a common time reference for time-tagging of signals and events.
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83.5.2 Products/services

None.

83.5.3 Equipment/schematic

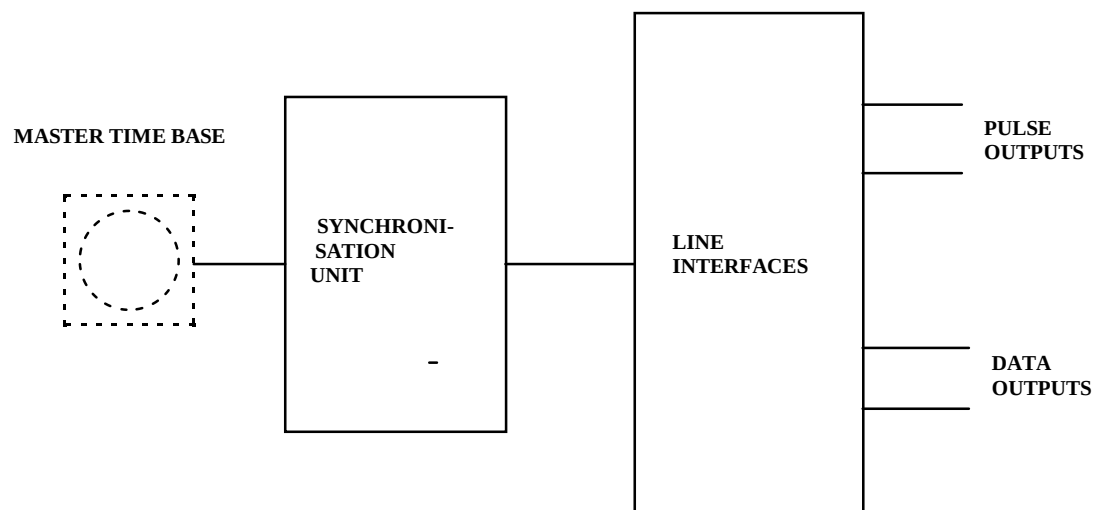


Figure 1 Equipment/schematic diagram.

83.5.4 Performance

83.5.4.1 Analogue outputs

Synchronising pulse interval	One minute.
Timing	In second 59.
Duration of timing pulse	1s.
Timing accuracy	Better than 20ms.

83.5.4.2 Data outputs

Data telegram interval	One minute.
Synchronising character timing	In second 00: SUB (Hex 1B).
Timing accuracy	Better than 20ms.
Telegram format	See Annex A.

83.5.5 Regularity

See section 0.

83.5.6 Process/ambient conditions

Radio receiving antennas	Located outdoor in a non-hazardous area.
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83.5.7 Operational requirements

Operation	Unattended.
Summer/winter time change	Automatic on selected outputs.
Local time / UTC	Selectable on individual outputs
Line interfaces	The data output interface module shall be expandable and shall accommodate modular built modems if required.

83.5.8 Maintenance requirements

See section 0.

83.5.9 Isolation and sectioning

None.

83.5.10 Layout requirements

None.

83.5.11 Interface requirements

Analogue outputs	TTL or 24 volt DC (selectable).
Data interface output	V.11 or V.24/V.28.
Alarm output	A voltage free contact.

83.5.12 Commissioning requirements

See section 0.

ANNEX A REAL TIME CLOCK MESSAGE FORMAT (22 BYTES)

Byte 1	ASCII	T (HEX 54)
Byte 2	ASCII	TENS OF HOURS
Byte 3	ASCII	UNITS OF HOURS
Byte 4	ASCII	: (HEX 3A)
Byte 5	ASCII	TENS OF MINUTES
Byte 6	ASCII	UNITS OF MINUTES
Byte 7	ASCII	: (HEX 3A)
Byte 8	ASCII	TENS OF SECONDS
Byte 9	ASCII	UNITS OF SECONDS
Byte 10	ASCII	Space (HEX 20)
Byte 11	ASCII	TENS OF DAYS OF MONTH
Byte 12	ASCII	UNITS OF DAY OF MONTH
Byte 13	ASCII	/ (HEX 2F)
Byte 14	ASCII	TENS OF MONTH
Byte 15	ASCII	UNITS OF MONTH
Byte 16	ASCII	/ (HEX 2F)
Byte 17	ASCII	TENS OF YEAR
Byte 18	ASCII	UNITS OF YEAR
Byte 19	ASCII	DAY OF WEEK 30 = Sunday 31 = Monday ----- 36 = Saturday
Byte 20	Data	0100 ABCD A = 1 for loaded since switch-on B = 1 for loaded in last minute C = 1 for leap year D = 1 for BST (British Summer Time)
Byte 21	Checksum	(Longitudinal redundancy check of bytes 1 to 20 inclusive)
Byte 22	ASCII	Carriage return (HEX 0D)

84 TELECOM SURVEILLANCE AND MONITORING

84.1 FOREWORD

This is a section of NORSOK standard T-SR-100, Telecom subsystems. Please refer to section 0 for definitions, abbreviations and requirements common to all telecom subsystems.

84.2 SCOPE

This section defines the requirements for remote surveillance and monitoring of telecommunication systems on offshore production installations.

The main type of required alarms from telecom systems are listed.

84.3 NORMATIVE REFERENCES

See section 0.

84.4 DEFINITION AND ABBREVIATIONS

84.4.1 Definitions

See section 0.

84.4.2 Abbreviations

SNMP	Simple Network Management Protocol.
Other abbreviations	See section 0.

84.5 FUNCTIONAL REQUIREMENTS

84.5.1 General

The monitoring systems should be able to receive and analyse spontaneous alarms from the telecom systems and also perform regular polling to check the telecom systems.

The interface (Line and protocol) for alarms and remote diagnostics for telecommunication systems should be adapted to common standards in order to permit standardised connection into a central surveillance system.

The monitoring and surveillance messages should be transmitted by existing network. Dedicated lines should be avoided.

Diagnostics and remote control should also be included where the telecom systems have such options. The diagnostic software normally supplied together with the telecom systems should then be used from the central station. The diagnostic software should therefore be designed to operate in such environment.

The PABX, multiplexer and local area network may have their own network management systems that are not addressed here. If possible, however, alarms and remote diagnostics for these subsystems should be integrated into the common central manager station described in this standard.

84.5.2 Products/service

- System overview
- An alarm/diagnostics interface integrated with each relevant telecom subsystem.
 - Diagnostic and control software supplied with the telecom systems.
 - Local agents that collect alarms and diagnostic data, and/or are polling subsystems, and also have the ability to relay control signals to subsystems (not required if the subsystem includes such features).
 - Central manager station(s) or central diagnostic station(s) communicating with the various local agents.

84.5.3 Equipment/schematic

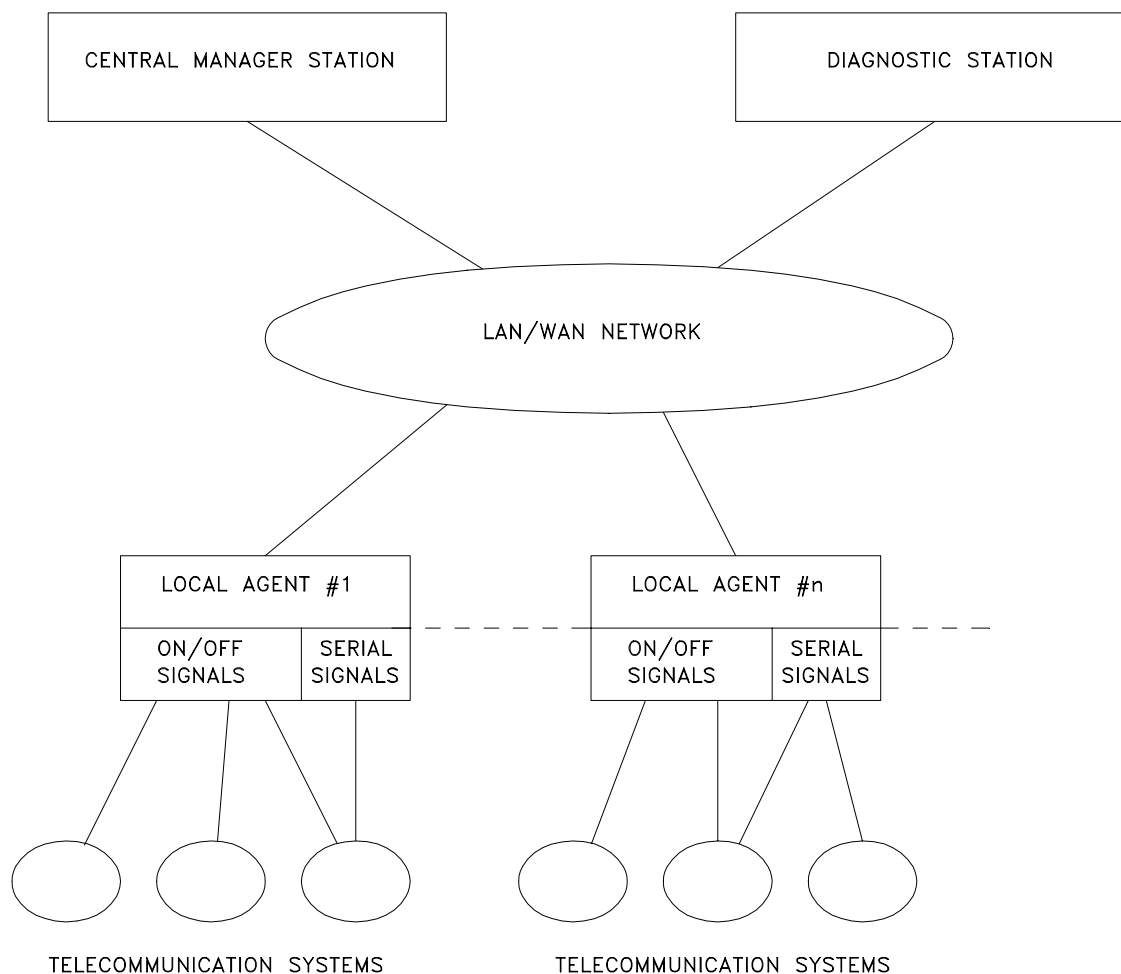


Figure 1 Equipment/schematic diagram.

84.5.4 Performance

Facilities at central manager station:

- Total overview of networks, telecom systems, and parts thereof.
- Display of alarms requiring operator attention.
- Access via LAN/WAN to local agents for further inf.
- Access to telecom subsystems through their serial interface, for diagnosis and direct intervention.
- The ability to host and run suppliers' standard diagnostic software.

- Printing facilities.

Facilities at local agents:

- Collection of on/off signals from connected equipment.
- Analysis of diagnostic messages from telecom sub systems on serial interface.
- Repackaging in a form suitable for transmission over the established LAN/WAN and transmission to the central manager of serially transmitted alarms and diagnostic messages.
- Relay from central manager to sub systems of on/off and serial maintenance and control signals.

84.5.5 Regularity

84.5.5.1 MTBF

Central system/Diagnostics station	2 years.
Local agents	5 years.

84.5.6 Process/ambient conditions

See section 0.

84.5.7 Operational requirements

84.5.7.1 Monitoring and surveillance system

Monitoring and surveillance shall be possible from:

- Central monitoring station.
- Backup or parallel station.
- Local agent or local monitoring station.
- Process control centre.

The presentation and handling of alarms on the central monitoring station is not detailed in this standard.

Diagnostics and control shall be possible from:

- Central monitoring station.
- Other Stations connected to the network.
- Local controls on the equipment.

The diagnostics and controlling software for telecom sub systems shall:

- Run with a standard operating system (UNIX, OS/2, MS Windows).
- Use standard functions in the operating system for external connections and information exchange.
- Use protocols which enable information to be transferred on the LAN/WAN to the telecom equipment (Repackaged by local agent).
- Coexist with software from other suppliers (MS Windows, UNIX, etc.).

84.5.7.2 Types of required alarms from telecom sub systems

The telecom systems should be designed to present alarms for the following categories.

Alarms required for	- Telecom system malfunction.
	- Major/important parts of the system not operating.
	- External conditions affecting systems performance.

- Warnings for
- Conditions which may lead to a alarm condition (proactive alerting).
 - Minor parts of the system out of operation.

(The specific standards for telecom systems may detail requirements for alarms).

84.5.8 Maintenance requirements

The system shall monitor its own functions and give alarms if not operational.

84.5.9 Isolation and sectioning

None.

84.5.10 Layout requirements

None.

84.5.11 Interface requirements

The following interfaces or equivalent common standards should be used:

Between local agent and telecom subsystem

- On/off relay contacts.
- Serial line.
- LAN.

Serial line standard

- V.24/V.28, V.10, or V.11 for use with industry standard PC.

Between central system and local agent

- LAN/WAN.
- Alarm format: CCITT Rec.X.733.
- Alarm categories: CCITT Rec. X 733.

LAN/WAN protocol

- SNMP.
- CMIP Qx.
- Other open standard.

Central system operating system

- Industry standard (UNIX, OS/2, MS Windows).

Computer platform

- Industry standard.

84.5.12 Commissioning requirements

See section 0.