B 400
HF
Communications
Receiver

Reception
with
optimum
performance

Ingeniørfirmaet
M. P. Pedersen

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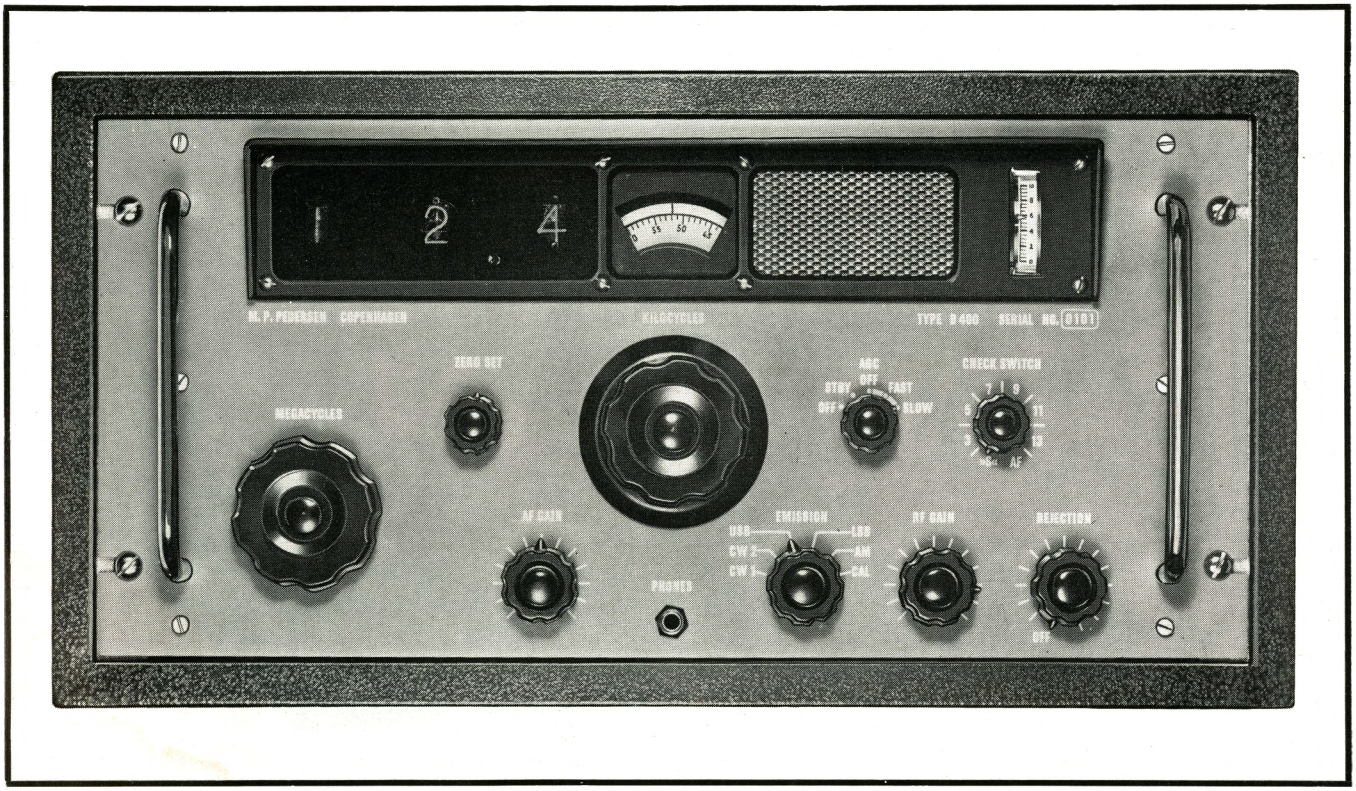
Communications Receiver



Communications Receiver B 400 is the latest model of a series of general purpose receivers which have found wide application all over the world in various communication services.

The receiver offers reception of upper sideband, lower sideband, FSK, AM and CW signals with continuous coverage of the 10 kHz to 30 MHz range. The range is covered in 30 one MHz bands. An improved dial uses a digital type of readout for MHz and tenths of MHz. The main tuning control covers each of these megahertz bands with a dial calibrated at one kHz intervals.

The frequency stability of the receiver is consistent with the calibration of one kHz dial division even at the highest frequencies.

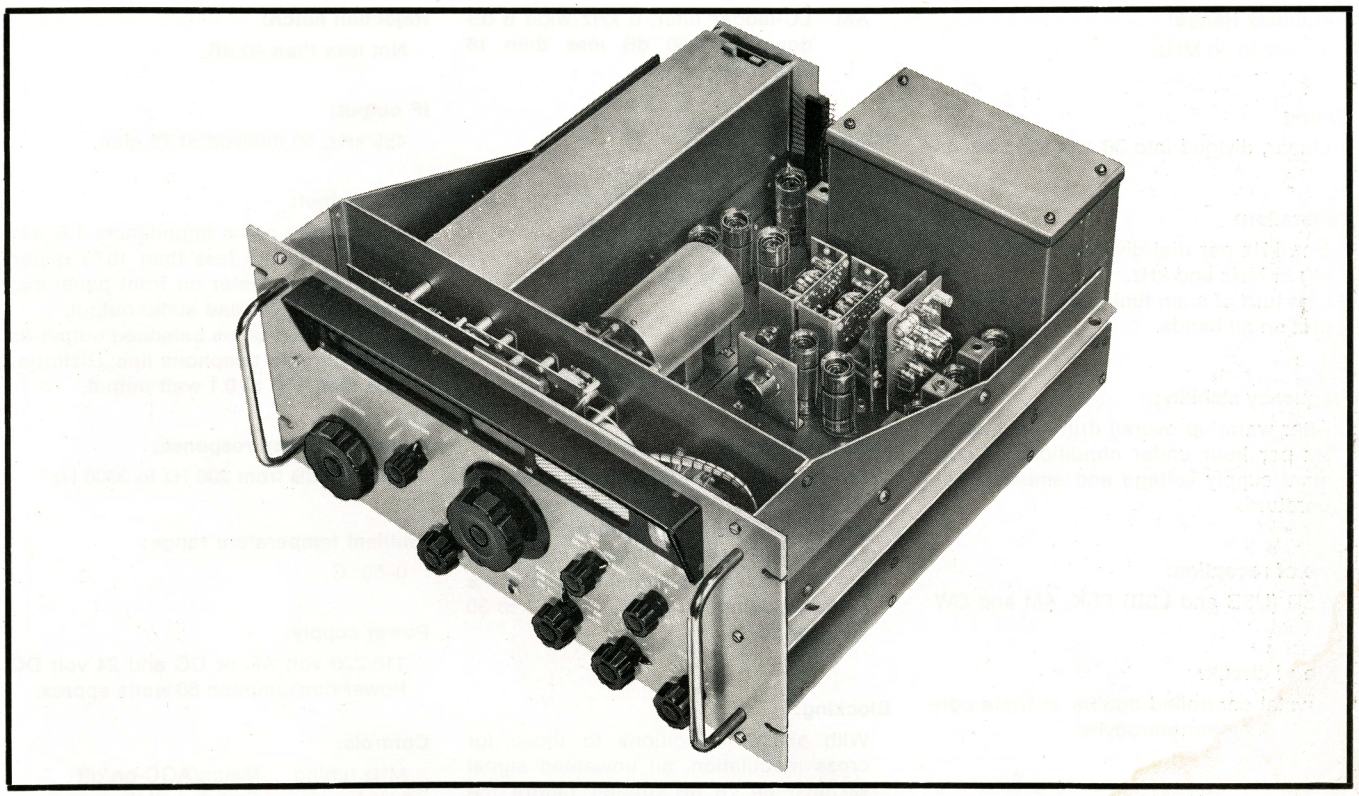
The frequency accuracy and stability of the B 400 receiver makes it extremely useful for communications where it is desired to receive known frequencies without searching, or frequent readjustment. It can also be used in space diversity and frequency diversity systems, when high reliability of communications is required regardless of signal path problems in fading and losses introduced by the terrain and atmospheric disturbances.

The radio frequency circuits include double tuned antenna inductors, which minimize spurious signal response and reduce adjacent channel interference.

The receiver employs the superheterodyne principle of operation in triple or double conversion depending on the operating frequency. A total of 16 crystals provide stable first injection frequencies for each of the 30 one-MHz bands. A highly stable, permeability tuned oscillator oper-

Very high frequency stability within 20 Hz per hour under normal ambient conditions after warm-up.

Frequency range 10 kHz to 30 MHz, subdivided into 30 one-MHz bands.



ating in the 2.5 to 3.5 MHz range provides the second injection frequency.

The inherent stability of the receiver is supplemented by a built-in 1 MHz crystal calibration oscillator, which may be adjusted for zero beat against standard frequency transmission such as the WWV.

The 1 MHz oscillator is subdivided into 100 kHz. Thus, precision crystal check points are available at each 100 kHz interval throughout the tuning range of the receiver, and a ZERO SET knob is provided to permit the dial to be set to agree with the nearest check point.

In addition to the innovations in the tuning and frequency portions of the design, the B 400 receiver incorporates advanced circuitry in other respects important in a communications receiver.

An AGC system of high relative merit is incorporated in the B 400 (less than 3 dB change in output over signal input range of 2 μV to 0.2 volt) with attack and release times optimized for SSB-, CW- and AM-reception.

The IF selectivity in the B 400 is obtained by means of mechanical filters for SSB, crystal filter for CW and a L-C ladder filter for AM reception. The ideal selectivity is switched along with the desired emission thereby eliminating the selectivity knob.
Interfering heterodynes may easily be eliminated by means of the highly selective Q-multiplier, which can be controlled from the front panel. Heterodyne rejection capability is not less than 40 dB.
A low distortion balanced 600 ohms audio output permit its use for applications requiring the signal to be fed to a telephone line. LINE GAIN allows the signal to be amplified to a level sufficient to compensate for telephone line losses.
Provision has been included for operation from an optional DC power supply, to replace the conventional AC supply, allowing the B 400 to be operated from 110/220 volt DC or 24 volt battery.

Precise frequency setting ability approx. 280 cm. or 110 inches of bandspread for one-MHz coverage.

Single sideband reception without attachment.
Very effective automatic gain control also in receiving without carrier.

Specifications

Frequency Range:
10 kHz to 30 MHz.

Tuning
Linear, divided into 30 one MHz bands.

Calibration:
One kHz per dial division. Direct reading in MHz and kHz.
One turn of main tuning dial covers 100 kHz on all bands.

Frequency stability:
After warm-up overall drift less than 20 Hz per hour under conditions of constant supply voltage and ambient temperature.

Type of reception:
SSB (USB and LSB) FSK, AM and CW.

Type of circuit:
Crystal controlled double or triple conversion superheterodyne.

Sensitivity:
SSB and CW: below 1 MHz, 6 μV for 10 dB signal to noise ratio.
above 1 MHz, 0.6 μV for 10 dB signal to noise ratio.
AM: above 1 MHz, 3 μV for 10 dB signal to noise ratio.

Selectivity:
CW: Crystalfilter, 800 Hz wide 6 dB down, at –60 dB less than 3.2 kHz wide.
SSB: Mechanical filters, 2.5 kHz wide 6 dB down, at –60 dB less than 6.5 kHz wide.
AM: LC-ladder filter, 6 kHz wide 6 dB down, at –60 dB less than 18 kHz wide.

Image rejection:
1 to 7 MHz: 90 dB or more.
7 to 14 MHz: 70 dB or more.
14 to 20 MHz: 60 dB or more.
20 to 25 MHz: 50 dB or more.
25 to 30 MHz: 45 dB or more.

IF rejection:
1 to 30 MHz: 80 dB or more.

Cross modulation:
For levels of wanted signal between 3 μV and 100 μV an interfering signal 10 kHz removed and modulated 30 % must have a level greater than 60 dB above that of the wanted signal to produce a cross modulation of 10 % in the 1 to 30 MHz range.

Blocking:
With similar conditions to those for cross modulation, an unwanted signal f2 must be 76 dB greater before the audio output of the wanted signal f1 is reduced by 3 dB due to blocking.

Automatic gain control:
Not more than 3 dB change in audio output with RF-signals from 2 μV to 0.2 volt.

AGC time constants:
Fast: Charge – 1 millisecond.
Discharge – 200 milliseconds.
Slow: Charge – 1 millisecond.
Discharge – 3 seconds.

Rejection notch:
Not less than 40 dB.

IF output:
455 kHz, 50 millivolt at 75 ohm.

Audio output:
3.2 and 600 ohms impedance. 1.5 watt at 1000 Hz with less than 10 % distortion over-all. Meter on front panel may be switched to read audio output.
Separate 600 ohms balanced output for connection to telephone line. Distortion less than 1 % at 0.1 watt output.

Audio frequency response:
Within 6 dB from 200 Hz to 3300 Hz.

Ambient temperature range:
0–50° C.

Power supply:
110/220 volt AC or DC and 24 volt DC.
Power consumption 60 watts approx.

Controls:

MHz tuning	Mains/AGC-on/off
kHz tuning	Check-switch
Zero set	Emission
AF-gain	Rejection
RF-gain	

Dimensions:
Without cabinet:

Height	With	Depth	Weight
222.5 mm.	483 mm.	520 mm.	28 kg.

With cabinet:

Height	With	Depth	Weight
335 mm.	530 mm.	520 mm.	42 kg.

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Data are subject to change without notice.

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